American Machinist

ESTABLISHED 1877 McGRAW-HILL PUBLISHING COMPANY, INC.
VOLUME 78 NUMBER 2

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EDITORS

January 17, 1934

EQUIPPING FOR THE NEW DEAL

AS THE NEW DEAL recovery program attains full stride its objectives are becoming progressively clearer. The workman is to get a higher wage—the consumer is to be protected against sharp increases in price.

Industry must achieve a higher level of efficiency if it is to prosper under these conditions. It must plan systematically to reduce its costs through new methods of processing and through improved equipment.

LAST YEAR SAW the recovery program launched and its mechanism developed. Governmental agencies for the stimulation of business grew from mere words on the statute books into dynamic organizations.

Last year saw the sophistry discredited that mechanical improvement was the cause of our economic dilemma. Careful studies in the NRA established the fact that restoration of prosperity could not be brought about without a revival of our capital goods industries.

Last year saw the beginning of a new life in business that gives every evidence of carrying through. The people of the country are demanding goods that will restore and surpass their former standard of living. Industrial concerns are requiring equipment that will effect the plant modernization so long deferred.

THIS YEAR WILL SEE practically all of industry codified by the NRA. Public works expenditures will reach a peak. If present indicators are a reliable guide, the demand for consumer and capital goods will show further increase. Foreign trade, so long dormant, will again become an important influence in business.

At no time in this country's history has it been so important for manufacturers to survey their methods and equipment with the view of earning profits through savings in operation. Such action is vital to their own existence and to the wider move to general prosperity of which they are necessarily a part. These pages are offered with the thought that they will aid equipment selection, create profitable operation in individual plants and thus contribute to the trend toward better times.

Annual Review of New Equipment

IN THIS FIRST annual review of new equipment there are 697 items on machine tools, other production machines, portable tools and small tools, inspection devices, and accessory equipment and materials for the metal-working plant. Of these 697 items 444 are from American sources and 253 from European producers.

So far as American equipment is concerned, the general-purpose machine predominates, and the special-purpose machine is conspicuous by its almost total absence. This points to the most important trend during 1933. The reason for it is put succinctly by William Hartman, vice-president in charge of manufacturing, The National Cash Register Company, when he says, "It has been found that with the greatly reduced production schedule there is greater flexibility in the general-purpose machine with a minimum investment." This conclusion is amplified by J. R. Weaver, manufacturing equipment department, Westinghouse Electric & Manufacturing Company, who states, "During the past year special machines could not be justified but it was necessary to keep costs to an absolute minimum. The result was a change in trend from special machines to standard machines with special fixtures."

Electric vs. Hydraulic Controls

Mr. Weaver also observes that machine builders are realizing more and more the advantages of fabricated structures built up from steel plate and shapes gas-cut and welded together. He also finds that electrical equipment is eliminating gears, shafts and other parts to secure more convenient operation and to reduce maintenance cost. W. J. Peets, of the Singer Manufacturing Company, believes that electric control for the various units is likely to succeed some of the hydraulic controls now employed. Perhaps an indication of this is a milling machine with electrical control of the table movements.

Flexibility, reduced setup or chucking time, greater rigidity and accuracy are other qualities that machine-tool builders everywhere are striving to put into their products. Comparison of a 1933 machine with a not so modern machine reveals that the newer one has heavier construction, more pleasing design and greater safety for the operator.

During the year the possibilities of external or surface broaching have suddenly captured the interest of certain portions of the metal-working industry, particularly the automotive portion. Attention was focused on the subject by a paper (*AM*—Vol. 77, page 623) presented by C. E. Bleicher, staff master mechanic, Dodge Main Plant, before the International Automotive Engineering Congress at Chicago, August 29, 1933. Much controversy has since arisen between broaching and milling specialists, besides others, concerning the merits and field of use of each process. Now Mr. Bleicher contributes the following statement, "While it is true that surface broaching has been done in years gone by, this is the first year that it has ever come into general use. The Chrysler Corporation as a whole, taking in the Dodge, Plymouth, Newcastle and Jefferson plants, has spent in the neighborhood of $150,000 this year on surface broaching equipment."

Highlights

More information on design trends is gained from study of the 73 pages of review items. In the American section there is a large horizontal boring machine that performs four operations—boring, drilling, milling and shaping—to save setup time on bulky work. Precision boring machines are improved. These machines have gained wide acceptance in various industries, and particularly in refrigerator manufacture (*AM*—Vol. 77, page 677). From his experience with them B. G. Tang, general superintendent, Schenectady Works, General Electric Company, writes, "Exceptionally round and straight holes are possible . . . and fine finishes are obtained with correctly shaped tools. Where soft materials are to be finished the machine works out, in most cases, as successfully as grinding."

A large hydraulic cylinder and ram directly over the stub spindle of an upright drill eliminate the saddle and give better alignment. Hydraulic step feed on another machine makes feasible the drilling of deep holes with small-diameter drills. Flexibility for immediate setup or for later model changes is secured in a self-contained drillhead by incorporating a motor-driven feed pump and controls.

Continuous cutting of spiral bevel gears is done on a certain hobbing machine which feeds the work after each revolution by means of a stepped cam. The cutter is a disk with teeth at right angles to the face and arranged on a spiral. A conventional hobber is automatic in operation. Three different principles of gear lapping are exhibited by as many machines.

Once again grinding machines comprise the largest group under review. As a class they make more use of hydraulic movements and controls than any other class of equipment. Cylindrical and internal grinders are among those so equipped. A much heavier and larger chucking-type internal grinder is said to finish grind airplane cylinders and similar exacting work so well that subsequent operations are unnecessary. In several surface grinders the motor-on-spindle principle of construction results in smoother drive, better finish and greater applied power at the wheel. There is continuing insistence on better finish in grinding and production of higher standards of accuracy with a minimum of inspection. For these reasons there have been developed automatic sizing equipments for maintaining size to 0.00025 in. One device is electrical and the other pneumatic in nature. These devices control the feed and other machine movements.

Milling Machines

Spindle speeds and feeds of milling machines have been extended in range and number to make use of high-speed steel and carbide cutters on all classes of material. More motors are used on the larger types and they are electrically interlocked. A planer-type milling machine has four independent heads each with an adjustable-speed d.c. motor and gearbox. A small-lot manufacturing miller has the table movements take place in rapid succession through means of electrically controlled plungers. A cam-feed miller is made more generally useful with respect to milling slots or surfaces on contours by having provision for mounting readily changed indexing fixtures. A rotary multi-head planetary miller does circular or thread milling operations at the rate of twelve pieces per minute to a guaranteed accuracy of 0.00025 in.

Under the classification of "Other Machines" are 43 items one or two of a kind that cover many different types of shop operations. These items also show considerable improvement. Among

them are two surface broaching machines.

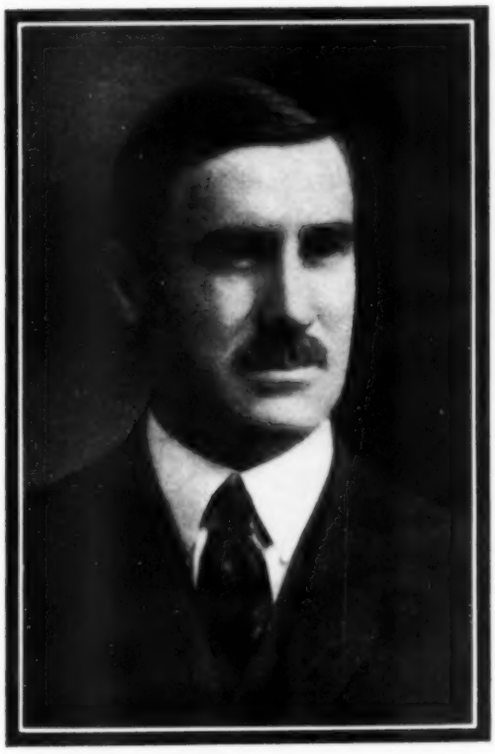
With machinery of all types being electrified at an increasing rate it is well to consider the motors and controlling devices under "Electrical Equipment." Inclosed motors are most common. Motor-starting switches photoelectric relays, mercury switches and push buttons are a few of the types of controlling devices under review.

During the last year or so there has been a move by many manufacturers to combine a speed reducing mechanism and a motor in a single unit. These motorized speed reducers are compact, in most cases occupying little more space than the motor itself and delivering the proper speed to the driven machine or mechanism with simple provision for mounting.

Progress in alloys and steels is shown by a nickel-chromium cast iron for abrasion-resisting applications, a deep drawing sheet steel, a bessemer screw steel with improved machineability, a stabilized stainless steel that removes the hazard of intergrannular corrosion, and nickel-clad steel plates.

The 253 items reviewed from the European Edition come from British and Continental builders. Although there are many production machines among this number, the distinguishing difference between the European and the American equipment reviewed is that many large and often special-purpose machine tools are found among the former. For example, five horizontal boring machines, one weighing 63 tons, and an 18-ft. boring mill are reviewed. A jig boring machine has guideways on a semi-circular member to give angular adjustment to the boring head in all directions. With a swiveling or rotary table, all sides of the work can be reached. Ordinarily, bar machines are horizontal, but a Swiss make is vertical, the claim being larger capacity and less bar whip.

Radial drilling machines all have motorized saddles. Unit-head drilling machines are shown for automotive work. Cylindrical grinders follow American practice in many details, namely, V-belt drive to wheel spindle and hydraulic table traverse. A spline-shaft grinder finishes all surfaces of a spline at each pass. An internal spline grinder also grinds the full length and depth of a spline at one pass. After a downward stroke through one spline the head moves horizontally to the opposite spline for the upward stroke and then indexes. Several turret lathes are shown. Some of these are designed for carbide tools and for short-run production. Slot and spline millers have such features as hydraulic traverse and in-feed and automatic operation.



EDWARD J. KEARNEY

A Leader Lost to the Machine Tool Industry

By the death of Edward J. Kearney on the afternoon of January 12, the machine tool industry lost an outstanding figure and its members a steadfast friend. A man of many interests, Mr. Kearney was first an industrialist and took great pride in the loyal organization which he and Theodore Trecker developed over a period of thirty-five years.

Mr. Kearney was born in Iowa in 1868 and was first employed as a fireman on the C. M. & St. P. Railroad. His early ambitions were reflected by the fact that during his last four years at this occupation he alternated between the railroad and Iowa State College. He graduated in 1893 with the degree of Batchelor of Mechanical Engineering.

In November of that year Mr. Kearney started work in the West Milwaukee Locomotive Shops. The following year in June he became a draftsman at the Kempsmith Machine Tool Company. Here he met Mr. Trecker and developed a friendship that has endured ever since.

At the time of the Spanish American war these two friends, still working side by side, decided that if Dewey were victorious they would start in business together. This resolution was put into effect on May 17, 1898 when a partnership was formed under the name of Kearney & Trecker.

After serving as vice-president for four years, Mr. Kearney in 1922 was elected president of the National Machine Tool Builders Association. His leadership was always progressive. He was a staunch believer in research and standardization for the industry and for his own shop. He was a member of long standing of the A.S.M.E.

Mr. Kearney was also secretary and treasurer of the Investment Corporation, a director of the LeRoi Company, a trustee of Milwaukee Downer College and a former member of the Wisconsin Vocational School board. During the World War he acted as Director of Sales for the Liberty Loan drives in the Seventh Federal District.

A fine engineer is lost to industry, a considerate executive is lost to his employees, a prominent citizen is lost to Milwaukee and a loyal friend is lost to his many admirers.

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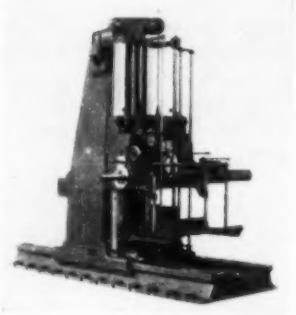
Boring and Turning Machines

Boring, Drilling and Milling Machine, Horizontal, Two-Spindle

Giddings & Lewis Machine Tool Co., Fond du Lac, Wis. (Vol.77,p.446) 220.

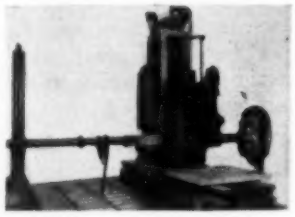
A floor-type No. 35-F model has a 3½ in. main spindle running at speeds up to 500 r.p.m., and an auxiliary spindle running at speeds up to 1,500 r.p.m. for drilling or boring of small holes. Each spindle has 36 speeds and 18 feeds arranged in geometrical progression. A separate milling feed unit with 18 feeds with directional control is built into the spindle head. The machine is controlled by the operator standing on a telescoping platform. The machine can be furnished with a maximum vertical travel of the spindle head on the column of 96 in.



Boring, Drilling, Milling Machine and Planer

Morton Mfg. Co., Broadway & Hoyt St., Muskegon Hts., Mich. (Vol.77,p.27) 4.

A machine which combines the features of horizontal boring, drilling, milling, vertical milling, right-angle boring, shaping, planing and slotting, has a 48-in. cutting stroke and a bed 14 ft. long. It provides a horizontal feed of 9 ft., and a vertical feed of 4[illegible] in. on the column. A d.c., reversing, planer-type motor, of not less than 10 hp. drives the machine. Speed variation ranges from 250 to 1250 r.p.m.

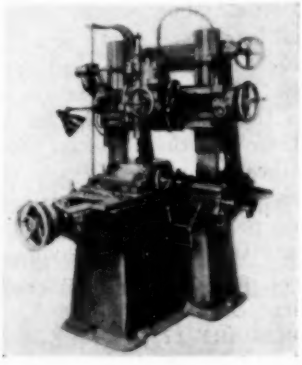


The ram is 8 in. square, has rack teeth cut on the back for applying power when planing or feed when boring. Within the ram and journalled on antifriction bearings is a 4½ in. heat-treated arbor. Feed change gearbox has 30 feed changes for boring and milling. Floor space, 14x16 ft.; weight, 44,000 lb.

Boring Machine, Jig, "Hauser," No. 3½

Index Machinery Corp., 49 Central Ave., Cincinnati, O. (Vol.77,p.796) 381.

Specifications: working surface of 26x16 in.; distance between the table and nose spindle, 20 in.; distance between columns, 24 in.; diameter of the table, 15¾ in.; maximum boring depth, 5½ in.; maximum drilling capacity, 1 in.; maximum boring capacity, 4 in. Alignment

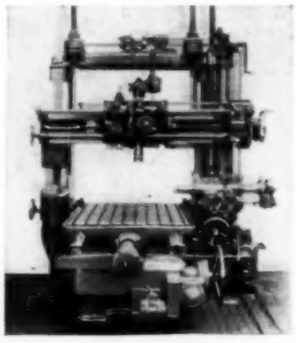


between the boring spindle and the work table is established by equipping the crossrail with hardened, ground and lapped locating plungers, which rest on hardened, ground and lapped blocks mounted on the housing members. The bearing contact is made at the outer end of the crossrail.

Boring Machine, Jig, Type MP-6B

R. Y. Ferner Co., Investment Bldg., Washington, D. C. (Vol.77,p.835) 441.

Locating, drilling and boring holes in the top and all sides of a box jig as large as 59x40x32 in. can be done on this machine, which is a product of the Société Genevoise d'Instruments de Physique. Geneva, Switzerland. This machine is designated as Model MP-6B. It has a horizontal spindle as well as two vertical spindles. One of the latter is a high-speed head for the drilling and boring of small holes. The horizontal boring head spindle has nine speeds, varying from 48 to 420 r.p.m., and three rates of power feed. Total feed is 12 inches. Use of the horizontal head is extended by use of a long boring bar. A circular table 31½ in. diameter has a worm screw with micrometer head and vernier to read the angular rotation to 1 second of arc. The cross-rail can be raised from 16 in. above the table to 36½ in. above it. The main spindle has 10 in. feed. The high-speed spindle has speeds from 140 to 1,250 r.p.m. and 4 in. feed.

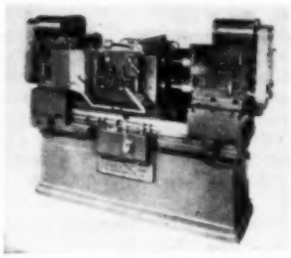


Drilling capacity of the two larger spindles in cast iron is 2 in., boring capacity, 6 in. The accuracy of all settings of the leadscrews is guaranteed to 0.0005 in. The lead screw of the rectangular table provides for 52 in. movement. The table is 59 in. long and 40½ in. wide

Boring Machine, Precision, for Steel

Ex-Cell-O Aircraft & Tool Corp., 1200 Oakman Blvd., Detroit, Mich. (Vol.77,p.161) 76.

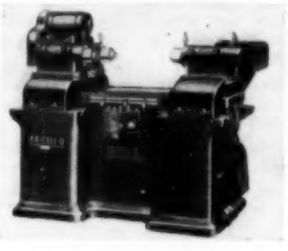
Steel parts, which do not exceed a hardness of 250 Brinell, 36 Scleroscope or 24 Rockwell, can be successfully bored. Illustrated is a double-end machine designed for finish boring large and small ends of a connecting rod in one operation. Large end is steel and the small end bronze. Approximately 0.018 in. to 0.020 in. of steel stock and 0.1008 in. to 0.010 in. of bronze stock is removed. The holding fixture is designed so that two rods are loaded at each end in a vertical position with the small end of the rod at the top.



Boring Machines, Precision, Single- and Double-End

Ex-Cell-O Aircraft & Tool Corp., 1200 Oakman Blvd., Detroit, Mich. (Vol.77,p.450) 218.

Short-production high-precision work on such parts as connecting rods, pistons, gears, motor-end frames, refrigerator compressor bodies, seal rings and similar parts can be done on the single- and double-end "Junior Style" hydraulic precision boring machines. The double-end, Style No. 1212, machine is illustrated. A bridge is provided at each end upon which one or two boring units are mounted. There are two different methods for driving the boring units, the inbuilt motor and the belt-driven type. A finished pad, 12x22 in., on the table is provided with T-slots for holding the work fixture. Floor space, 14½ sq.ft.; weight, 3,000 lb.



Boring Machine, Precision, No. 48

Heald Machine Co., Worcester, Mass. (Vol.77,p.484.) 229.

Smaller than other "Bore-Matics," but entirely automatic in operation, the No. 48 machine accommodates two boring heads. Boring head drive is from the opposite end of the motor shaft by means of multiple V-belts. With various combinations, the speed range covers 625 to 3,600 r.p.m., using an 1,800-r.p.m. motor. Maximum and minimum center distances between heads are 10 and 5⅞ in. There is ample room for locating fixtures on a finished table pad 9 in. wide by 22 in. long. The table is hydraulically operated on the boring stroke and returned by a gravity mechanism.

Boring, Centering and Drilling Machine, Piston

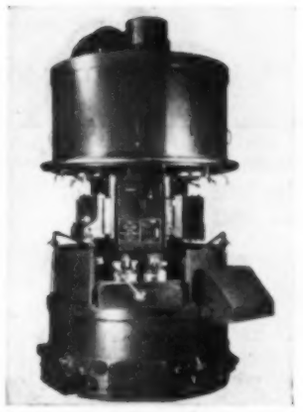
Millholland Sales & Machine Co., 1115 E. 35th St., Indianapolis, Ind. (Vol.77,p.801.) 388.

A two-way, double-bank, piston boring, centering and drilling machine bores and faces the open end and centers the closed end of the piston besides rough cross-drilling the piston-pin hole. The work is gripped by a two-jaw air chuck. Lower and upper banks of machine units are independently controlled so that the operator can load from the lower bank into the upper bank or can run each bank independently. Production, 300 to 400 pistons per hr.

Chucking Machine, "Mult-Au-Matic," Twin-Six-Spindle

Bullard Co., Bridgeport, Conn. (Vol.77 p.127.) 48.

Provided with two 7-in. chucks at each of the six stations, the Type "F" twin-six "Mult-Au-Matic" performs identical operations on work in each of the twin chucks, thereby doubling the productive output. The machine may be obtained with double indexing. The plain vertical tool head accommodates duplex tooling and has 6 in. vertical movement. The plain compound tool head is mounted on a saddle. Total stroke is 6 in., which may be applied as vertical movement only or to include a maximum movement of the tool slide of 3 in. horizontally, either right or left. High-speed model: speeds, 112 to 1,008 r.p.m.; feeds, 0.0031 to 0.0231 in.—low speed model: speeds, 46 to 417 r.p.m.; feeds, 0.0075 to 0.0678 in.

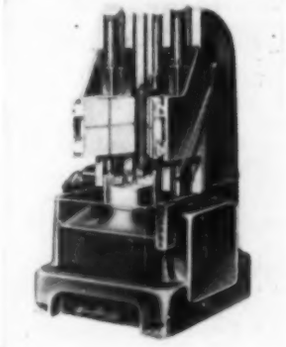


Chucking Machine, Vertical, Automatic, Single-Spindle

Bullard Co., Bridgeport, Conn. (Vol.77,p.448.) 224.

Flexibility is secured by the three individually controlled slides: two universal, each with a swivel for angular cutting, and one plain vertical center slide. Electrical control provides for automatic operation. Capacity is 10 in. in diameter by 32 in. in height, cutting with cross-slides; 10 in. in diameter by 36 in. in height, cutting with the center slide. There is a possible swing in the clear of 18 in. in diameter by 17½ in. in height. Feed mechanism for each slide is designed for stroke of 20 in. For chucking work the universal slides have downward and inward movement, while the center slide has only a vertical movement. A tailstock converts the machine into a center turning lathe.

Simple, standard tool holders are easily clamped to the slides. Each of the three heads is provided with 80 feed changes by change gears. There are 80 speed changes for the table, the maximum speed being 800 r.p.m. The steel spindle is mounted in Timken bearings and supports the 3-jaw chuck, which has a nominal rating of 12 in. but takes 14 in. The chuck is arranged with an inbuilt power chuck operator.



Drilling Machines

Drilling Machine, Upright, Hydraulic, No. H-2

Barnes Drill Co., Rockford, Ill. (Vol.77,p.574.) 262.

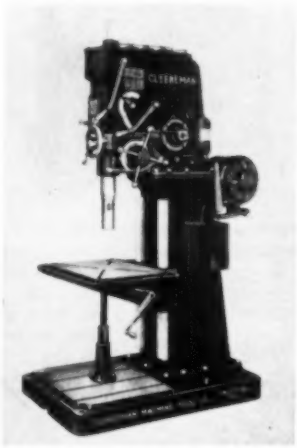
Hydraulic pressure applied directly over the center of the cutting tool or tools is the main design feature of the H-2 "Hydram" drilling machine which can be used in boring, reaming and facing operations. The large cylinder and ram eliminate the usual long saddle for maintaining alignment. The control permits of automatic

rapid approach, feeding rate, hydraulic dwell for facing and quick automatic return. Specifications: Capacity, high-speed drills in S.A.E. No. 1035 steel, 2 in.; swing, 24 in.; distance face of column to center of table, 12¼ in.; maximum distance, spindle to regular table, 31¼ in.; maximum distance, spindle to base, 46½ in.; vertical travel of spindle, 16 in.

Drilling, Boring and Tapping Machines, High-Speed

Bryant Machinery & Engineering Co., 400 W. Madison St., Chicago, Ill. (Vol.77,p.449.)

The Cleereman Machine Tool Co. has built a line of heavy-duty drilling machines with speeds as high as 1,700 r.p.m. in six different sizes. Swing ratings are 20, 22, 24, 24, 28 and 28 in. Capacities are as follows; for the first three sizes, ½-in. in S.A.E. 1,035 steel; the fourth, 2 in.; the fifth, ½ in.; and the sixth size, 2 in. Spindle and sleeve are made from heat-treated chrome manganese forgings. Twelve spindle speeds

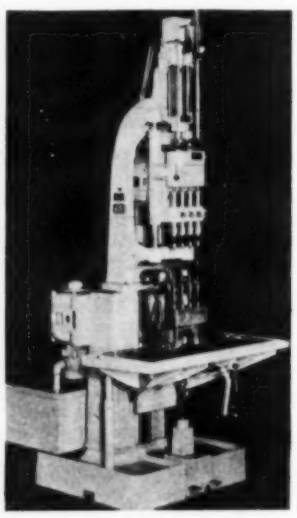


are secured. All gears and shafts are of chrome-nickel steel, heat-treated. Quick changes in speed are made through sliding gears and one positive-tooth clutch. Tap leads consisting of 12, 18, 24 and 36 threads per inch are built into the feed mechanism. The head is a unit within itself and can be arranged in gang style of two to six spindles.

Drilling Machine, Step, Hydraulic-Feed

Chas. G. Allen Co., Barre, Mass. (Vol.77,p.221,) 103.

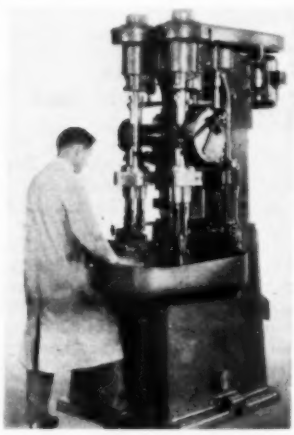
Each drilling unit has a maximum capacity of four ¾-in. holes, 8 in. deep, and two or more units can be mounted on one base. Drills are advanced at high speed to the work and automatically changed to fine feed. After drilling a predetermined depth of step they are withdrawn from the work and returned at high speed to the point previously drilled, after which they go into the fine feed again. The spindle slide carries four ball-bearing spindles having independent vertical adjustment and equipped with ⅜-in. chucks. Number and spacing of the spindles can be varied, and the machine can be furnished with any spindle speed from 750 to 3,000 r.p.m. The spindle slide has a maximum stroke of 9 in.



Drilling Machine, Upright, No. 3

Chas. G. Allen Co., Barre, Mass.. (Vol.77,p.226.) 104.

In the No. 3 drilling machine, which is suitable for drilling and reaming, drilling and countersinking, or drilling and tapping, each drill-head is controlled by its own cam, which can be designed to produce any practical combination of quick advance, feed and dwell or any desired lead for tapping, independent of the drilling feed. Loading four pieces at a time, 1,200 pieces per hour can be drilled and tapped in mild steel ½-in. thick with a 7/16 in.-20 tap. The indexing table is controlled by treadle.



Drilling Machine, Sensitive, Bench-Type

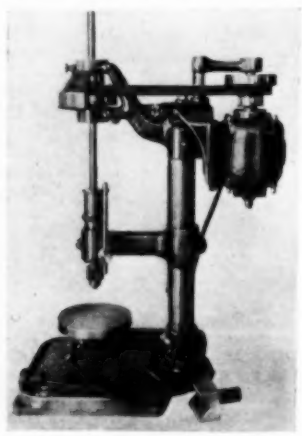
Delta Mfg. Co., 3775 N. Holton St., Milwaukee, Wis. (Vol.77,p.735.) 365.

Overall dimensions: 36¼ in. high; 10 in. wide, and 21 in. from front to rear with motor installed. The spindle runs in New Departure ball bearings. It is fitted with a 1 7/32 in. chuck. Interchangeable spindles are available, one fitted with a Jacobs chuck, one for No. 1 Morse taper-shank drills and one for standard ½-in. shank woodworking bits. Standard spindle speeds are: 590; 1,275; 2,450 and 5,000 r.p.m. Table surface, 11x16 in.

Drilling Machine, Sensitive

Rex Machine & Tool Co., 9 Sheridan St., San Francisco, Calif. (Vol.77,p.480.) 234.

Capacity of 7/16 in. and normal speeds of 875 to 3,600 r.p.m. are standard. The spindle is supplied with a Jacobs chuck. Spindle speeds up to 8,000 r.p.m.

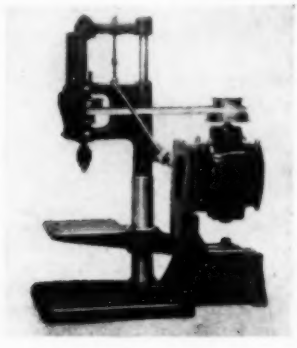


can be furnished. Belt tension is maintained by means of a sliding carrier for the driving pulley bracket. A precision V-block enables the user to locate cylindrical parts directly on the vertical axis of the drill. Table surface, 9x9 in.; quill travel, 2¾ in.; clearance between spindle and column, 6 in.; vertical clearance, 12 in.

Drilling Machine, Sensitive, No. 33

Langelier Mfg. Co., Providence, R. I. (Vol.77,p.576.)

A full ball-bearing spindle is employed. Either belt or motor drive can be supplied. The drill is rated at ¼ in. capacity and the following speeds can be obtained: 2,500 r.p.m. on



the single-speed, belt-driven model; 1,250, 2,250 or 3,500 r.p.m. with the low-speed or 2,500, 4,500 or 7,000 r.p.m. on the high-speed, motor-driven type. Distance from the column to the spindle is 4 in.; feed, 2½ in.; distance from the chuck to the table, 6¼ in.

Drilling Machine, Sensitive, No. 100

A. W. Redin & Son Machine Co., 1846 Eighteenth Ave., Rockford, Ill. (Vol.77,p.833.)

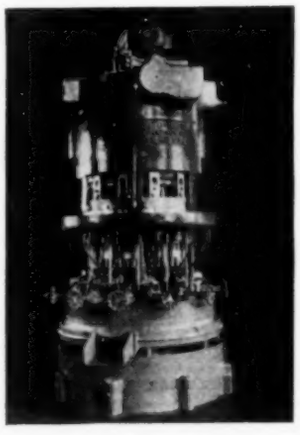
The four-speed, rolling-wedge transmission consists of a motor pulley and a spindle cone pulley with a non-metallic idler held against the two by means of a light spring. The idler pulley is wedged in between the two pulleys only when resistance is

applied to the spindle. Banks of two to eight heads can be assembled at 9½ in. centers. Specifications: drilling capacity, ½ in., spindle travel, 2 in.; spindle to column, 6 in.; table to chuck, maximum, 8 in., minimum 1 in.; table size, 9x12 in.

Drilling Machine, Continuous, Vertical, Twelve-Spindle

Davis & Thompson Co., 6619 W. Mitchell St., Milwaukee, Wis. (Vol.77,p.99.) 37.

The standard 12-spindle vertical drilling machine has been adapted for the use of two-spindle drillheads. There are twelve two-spindle drillheads

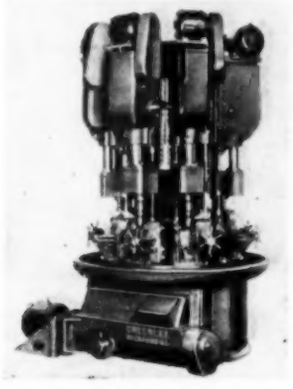


and twelve milling spindles to take straddle mills for the purpose of milling the boss on the end of steering arm. There are also twelve fixtures arranged to grip the arm of the boss. The fixtures oscillate. Movement of the fixtures is controlled by a cam under the table. Production with this method is approximately 600 pieces per hr.

Indexing Machine, Vertical

Greenlee Bros. & Co., Rockford, Ill. (Vol.77,p.255.) 111.

For multiple-operation work on large-production parts, the machine can be arranged for drilling, boring, reaming, counterboring, spot facing, milling,

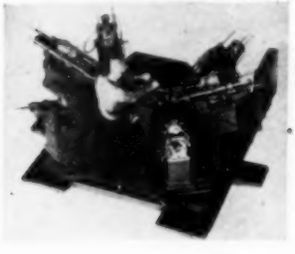


threading and tapping. It has oscillating cam feed. Table indexes automatically. Column carries quill-feed drive units for attaching single- or multiple-spindle drilling, boring and milling heads. As standard, 3, 4, 6 or 8 table positions are provided, one being used for loading.

Drilling Machine, Crankshaft, Oil-Hole, Six-Way

National Automatic Tool Co., Richmond, Ind. (Vol.77,p.545.) 268.

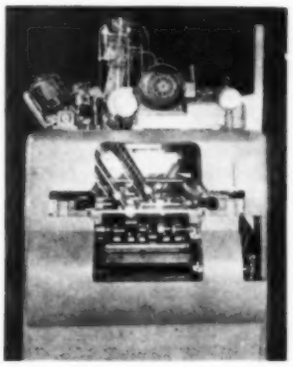
This six-headed special hydraulic-feed drilling machine is arranged to drill the oil holes in a forged steel crankshaft. The machine is semi-automatic. A special valve and trip mechanism permits automatic variation of drilling depths. The four-position trunnion fixture is arranged to hold one crankshaft in each position. Production, 25 crankshafts per hour.



Drilling Machine, Crankshaft

Davis & Thompson Co., 6619 W. Mitchell St., Milwaukee, Wis.. (Vol.77,p.93.) 38.

The machine drills a ⅜-in. hole that passes from the crankpin through the shaft and out through the main bearing, making four holes in each shaft. The hole is 5¼ in. deep. The machine is entirely automatic in



operation, and drilling is done by the step method, utilizing Vickers hydraulic units. Indexing is accomplished by hydraulic cylinders. The machine is double indexing. Production, 60 shafts per hr. The machine is a conveyor type, having 22 shafts in the machine when fully loaded.

Each of the four drillheads is driven by an individual motor. Each head carries two drills which machine separate crankshafts. Gears engaging a stationary rack rotate the shafts to bring the pins into the correct position.

Drilling Machine, Structural, Automatic

Artos Engineering Co., 327 E. Brown St., Milwaukee, Wis. (Vol.77,p.704.) 357.

Quick shifting from one hole to another and an automatic drilling operation are features of the drilling equipment developed for use in structural steel shops. The equipment consists of a drillhead suspended from a swinging and adjustable horizontal support. The drillhead is counterbalanced and mounted in a cradle. It is equipped with a clamp adjustable for thickness of material.

Drillhead, Solid-Adjustable

Hoefer Mfg. Co., Freeport, Ill. (Vol.77,p.220.) 97.

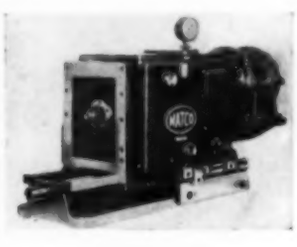
Various types of adaptors can be provided to fit any type of drive, whether it be for a drilling, milling, boring or other machine. The bottom is finished so that the swinging brackets carry their spindles in parallel planes, thus avoiding excessive drill bushing wear and non-

parallel holes. Inside the housing is carried the main drive shaft with its drive gear cut integral. From this main gear, power is delivered to as many idlers as there are spindles in the head. Each spindle bracket pivots around the idler to change the distance between the center of the spindle and center of drillhead.

Drilling Units, Hydraulic, Self-Contained

National Automatic Tool Co., Richmond, Ind. (Vol.77,p.642.)

These self-contained interchangeable and flexible hydraulic drilling units in six sizes can be arranged in groups to drill all holes in the various sides of a piece at one handling. Front face of the unit is flanged, and the holding bolt holes are jig-drilled. Two bushed dowel holes are bored to size and location. One motor drives the drillhead and the pump. The main shaft extends to the front end, at which point a gear is provided for driving the drillhead. Units are arranged with a semi-automatic hydraulic feed. Two independent feed control units provide adjustable rates of feed forward. A governor prevents fluctuations of the feed-rate.



Gear Cutting and Finishing Machines

Hobbing Machine, Spiral Bevel Gear

Cleveland Hobbing Machine Co., Cleveland, O. (Vol.77, p.543.) 258.

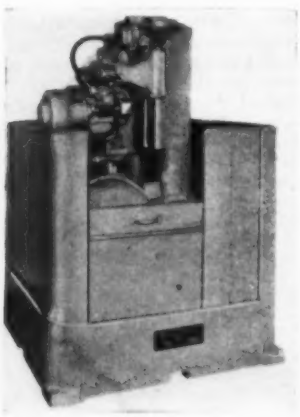
Both cutter and gear blank are rotated in continuous cutting engagement with each other, a stepped cam being used to feed the work after each revolution of the blank. The hob is an angular disk from one face of which extend the cutting teeth in a direction parallel

to the axis of the cutter. The cutting teeth are arranged on a spiral, the lead of which equals the circular pitch of the gear to be cut. Several of the first teeth have a cutting action similar to a broach. The following teeth generate the proper form of each tooth in the gear blank. Capacity—12 in. O.D.; capacity—8 D.P. to 3 D.P.

Hobbing Machine, Automatic

Lees-Bradner Co., Cleveland, O. (Vol.77,p.770.) 399.

A compact automatic hobber for cutting gears up to 7 in. outside diameter, 9 in. face and



up to 4 D.P. in steel, this machine requires only 16 sq.ft. of floor space. It will cut straight or taper serrations, spline shafts, spur gears, worm wheels, helical gears, right or left hand, and angles up to 45 deg. Antifriction bearings are used throughout the machine. Lubrication is supplied automatically. A tailstock is secured to the square ways of the column and it is actuated and clamped by a double movement of a single lever. A micrometer depth stop is supplied by which the depth of cut can be changed readily and against which the cutter head is held rigidly throughout cutting.

Rack-Cutting Machine, "Reinecker"

Geo. Scherr Co., 128 Lafayette St., New York, N. Y. (Vol.77,p.608.) 304.

By means of a swiveling cutterhead a helical rack can be cut by the Reinecker rack cutting machine in addition to a straight-tooth rack. The cutterhead can be swiveled in the vertical plane to 30 deg. Fully

automatic operation is provided. Table travel is automatically disengaged by an adjustable stop upon completion of the cutting operation.

Chamfering Machine, Spiral Bevel Gear

Bilgram Gear & Machine Wks., 1217-35 Spring Garden St., Philadelphia, Pa. (Vol.77, p.258.) 126.

Spiral bevel gears, wheels or pinions, are chamfered at the rate of more than 100 gears per hour. The toolhead is equipped with two tools. Thus, it is possible to chamfer both ends of one tooth with every stroke. The chuck is operated by com-

pressed air or hydraulically. The headstock is adjustable to from zero to 90 deg. Gears up to 18 in. in diameter and pinions with as few as five teeth can be chamfered. The machine operates at a speed of 100 to 160 strokes per min.

Workhead, Spiral-Gear

City Machine & Tool Works, Dayton, O. (Vol.77,p.222.) 61.

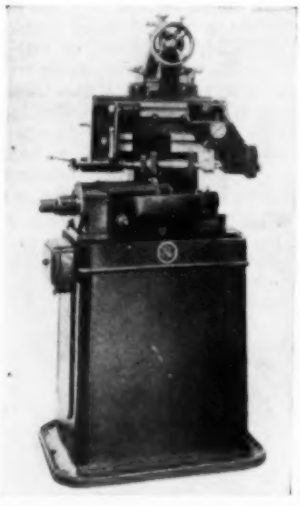
An improvement to the standard workhead permits the chamfering of spiral or helical gears rapidly. Developed particularly for helical gears this workhead

is equally adaptable to spur gears, and with slight changes can be applied to all No. 3 Peerless machines. The head can be quickly readjusted.

Lapping Machine, Gear, "Red Ring"

National Broach & Machine Co., Shoemaker & St. Jean Sts., Detroit, Mich. (Vol.77, p.28.) 6.

Inaccuracies found in heat-treated gears involving involute curvature, spiral angle, eccentricity, and tooth spacing are dealt with by the "Red Ring" gear lapping machine which operates on the crossed-axes principle employed for the gear cutting machine (*AM*—Vol. 76, p. 1206). Normally, lapping time will run from 2 to 5 min., floor to floor. One operator



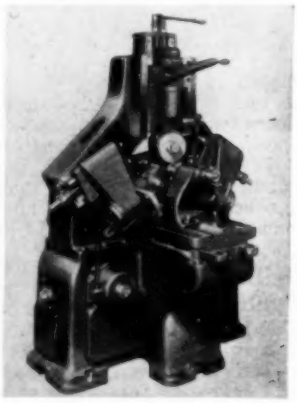
can handle four to six machines. A specially processed lap finished to a tolerance of 0.0002 in. is run at high speed with the work gear. The axis of the work gear arbor is set at an angle between 5 and 15 deg. with that of the lap gear shaft. The work gear is constantly reciprocated across the face of the lap gear. It is practicable to end lap a gear having a shoulder at one end larger than the outside diameter of the gear itself. A lap will process from 500 to 1,000 gears before recutting and it may be recut twice.

The column has angular adjustment so that the bearing on the gear can be shifted from one end of the tooth to the other. The lap is rotated a given number of revolutions in one direction, reversed for a given number of revolutions and stopped.

Lapping Machine, Gear

Michigan Tool Co., 7171 Six Mile Road, East, Detroit, Mich., (Vol.77,p.164.) 77.

Three laps are used, spaced equally around the work. Each of them may be set with its axis at an angle to the axis of the work, thereby producing a sliding action between the lap and gear teeth. A hydraulic



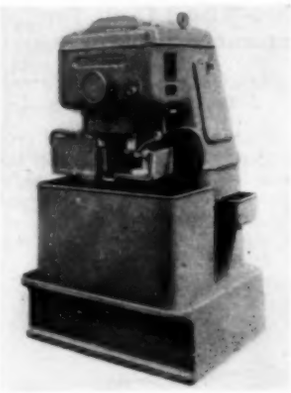
brake on each lap-spindle may be set to any predetermined pressure. The headstock and tailstock for supporting the work, either between centers or stub arbors, are mounted on a table which is oscillated at various speeds. The machine is almost entirely automatic.

Lapping Machine, Gear, "Werner"

Marburg Bros., 90 West St., New York, N. Y. (Vol.77, p. 675.) 329.

The "Werner" four-spindle, automatic gear lapping machine employs a triple-motion principle. Two upper spindles reciprocate axially and rotate also, whereas the lower spindles reciprocate laterally, producing a quasi-circular path of contact between the teeth at all parts of the flanks. Four gears are

processed at once. The stroke and speed of the axial and lateral reciprocating motions are adjustable. The lapping periods prior and subsequently to the reversal are adjustable. Specifications: Capacity — external gears: maximum center distance 8 in., minimum, 1 37/64 in.; internal gears—maximum outside diameter, 9 27/32 in., minimum pitch circle diameter of gears to be lapped with a pinion of 3 37/64 in. pitch circle diameter, 4¾ in., maximum distance, between upper and lower spindles, 10¼ in., minimum distance, 4 47/64 in.; axial adjustment of upper spindles, ½ in.

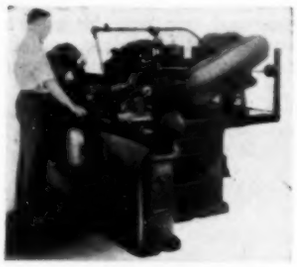


Grinding Machines

Grinder, Plain, Hydraulic, Type C, 10 In.

Landis Tool Co., Waynesboro, Pa. (Vol.77,p.191.) 73.

Such work as motor armatures, shafting and camshaft line bearings may be assigned to the machine. The wheelbase or headstock may be set at an angle. Semi-automatic or full-automatic operation is obtainable. Straight infeed grinding is facilitated by the

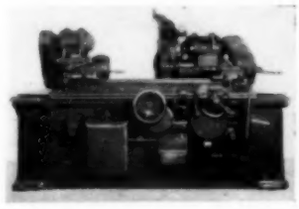


hydraulic straight - infeed mechanism. Other types of work for which the machine is suitable are formed-wheel grinding and multiple-wheel grinding. Table speeds range from 60 to 240 in. per min. Automatic hydraulic wheel feed, which functions at each reversal of the table, may be supplied.

Grinders, Cylindrical, Type C, 10 and 16 In.

Norton Co., Worcester, Mass. (Vol.77,p.764.) 384A.

The 10-in. size is available in lengths from 18 to 120 in.; 16-in. size in lengths from 36 to 144 in. Hydraulic table traverse, mechanical traverse and hand traverse models are available. In addition, 10-in. machines are built as semi - automatics, and hydraulic traverse machines may have semi-automatic features built in. The wheel unit with its slide-mounted motor drives the spindle directly through V-belts. Two standard spindle speeds are available.

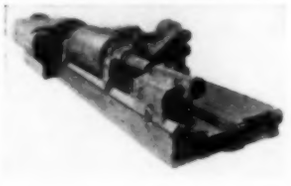


Hydraulic traverse machines employ a simple reverse valve that assures positive reversal at even the slowest table speed. Mechanical traverse machines have a reverse apron consisting of a totally inclosed clutch operating in oil and using first one and then a second bevel pinion constantly in mesh with a bevel gear. Semi-automatic machines are specialized plunge-cut grinders available in any standard length. They can be built with hand or hydraulic table traverse, live spindle or dead center headstock, hand or hydraulically operated footstock, automatic, mechanical or "Nortonizer" electrical sizing device, and with made-to-order fixtures. The grinding wheel is fed hydraulically.

Grinder, Roll, Heavy-Duty

Farrel-Birmingham Co., Ansonia, Conn. (Vol.77,p.383.) 195.

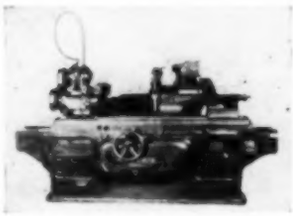
A grinder of 60 in. by 20 ft. capacity, this machine has a number of features designed to eliminate vibration, to promote accuracy of crowning or concaving, as well as straight grinding, and to refinish rolls in a short time. The speed reduction from the motor to the roll is obtained through four multiple V-belt drives. Backlash eliminating gear has been added to the patented crowning device. Eccentric and change gears are readily accessible so that settings for any curve can be quickly made. Features include: dead center head and footstocks; flexible faceplate drive; angle, water shedding front bed; centralized controls; flood-lubricated, inverted "V" ways; flexible steel covers for the carriage ways and drive rack; double helical gears to worm and rack traverse drive, and multiple V-belt spindle drive.



Grinder, Universal, Hydraulic, Type C, 14-In.

Landis Tool Co., Waynesoro, Pa. (Vol.77,p.352.) 172.

Three lengths are 36, 48 and 72 in. The headstock is fully universal, and it may be swiveled 90 deg. for face grinding. The wheelbase is also universal and may be swiveled 90 deg. either side of center. Standard equipment includes such features as an anti-friction internal grinding fixture, a chuck for internal and face



grinding, an automatic hydraulic wheel-feed mechanism, a center rest, and stationary and traveling cutter tooth rests. The large wheel spindle is driven at the end by a multiple V-belt. The double-cylinder, hydraulic table traversing mechanism provides an almost infinite number of table speeds.

Grinder, Tool and Cutter, No. 1

Norton Co., Worcester, Mass. (Vol.77,p.764.) 384C.

The wheel drive motor is mounted directly on the wheelhead to drive the spindle by V-belts. The wheelhead swivels 360 deg. Control of the machine can be had at either the front or the back. The universal workhead will swivel

360 deg. horizontally and 200 deg. vertically. Spindle takes either National Standard milling cutter shanks or B. & S. Nos. 12, 10, 9 or 7 tapers. The head mounts either a three-jaw or face chuck. Swing is 10 in. over the table and length admitted with the universal workhead is 17 in.

Grinder, Tool, Dual-Purpose

Wichita Machine Tool Co., Wichita, Kansas (Vol.77,p.288.) 136.

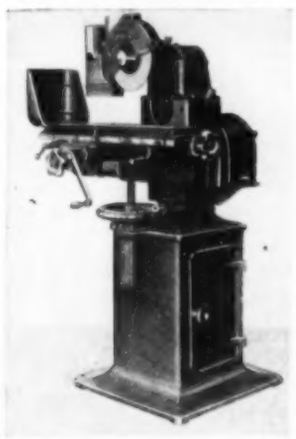
Internal or external grinding on locomotive taper reamers, milling cutters, end mills, machinists hand taps, spiral expansion reamers, solid reamers (without decreasing size), valve reseaters, boring bars, taper boiler reamers, lineshaft ream-

ers and general toolroom grinding can be done. Grinding head is universal in every direction and is brought to the work. Distance between centers is 17 in. An extension tailstock is provided to increase this distance to 48 in. Maximum diameter handled is 9 in.

Grinder, Chaser, No. 10

Geometric Tool Co., New Haven, Conn. (Vol.77,p.670.) 330a.

With proper fixtures, the No. 10 chaser grinder will sharpen any kind or make of diehead or tap chaser, milled, tapped, circular or tangent within its capacity and is also adaptable

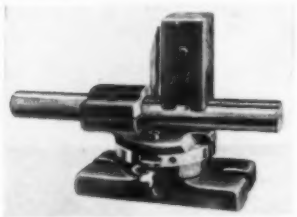


to other tool grinding. Workable, 26¾x6 in.; longitudinal table travel 15 in.; longitudinal fine feed, micrometer adjustment, 1½ in.; transverse table travel, 5½ in.; transverse fine feed, micrometer adjustment, 1½ in.; vertical table travel, micrometer adjustment, 9 in.; diameter of grinding wheel, 9 in.; clearance between wheel and table, 13½ in.

Grinding Fixture, Chaser, Style E

Geometric Tool Co., New Haven, Conn. (Vol.77,p.670.)

Used in grinding all types of chasers on both the chamfer and the cutting face. Besides use on the No. 10 chaser grinder this fixture can be used on any universal surface or

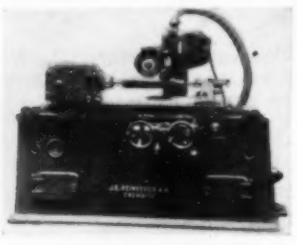


similar grinder. An additional plate permits the fixture to be offset, thus giving the proper chamfer clearance for tapped (hobbed) diehead chasers or collapsing tap chasers. Fine adjustment may be made.

Grinder, Tool, Universal, Reinecker

George Sherr Co., 128 Lafayette St., New York, N. Y. (Vol.77,p.738.) 340.

This machine is designed for the automatic sharpening of tools, especially cutters for spur gears, worm wheels, cylindrical and profiled cutters and tools with straight or spiral grooves. The grinding head swivels 360



deg. For cylindrical and internal grinding of tapered work the upper table is made to swivel on the lower table. Table movement takes place hydraulically. The hydraulic dividing head is arranged with automatic spacing and adjustable feed-in motion. It is possible to grind an angle of lead up to 65 deg. Indexing is carried out by hardened and ground index-plates, interchangeable. Length admitted with automatic dividing head, 625 mm., height of centers, 125 mm.

Grinder, Internal, No. 81

Heald Machine Co., Worcester, Mass. (Vol.77,p.831.) 440.

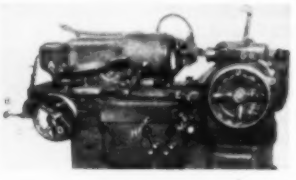
Features of the improved design are: separate motor drive to workhead, hydraulic actuation of the fixture operating mechanism, V-belt drive from the motor to the wheelhead idler shaft, improved switch box with concealed line switch, heavier base with improved rear shaft and water tank mounting, and hydraulic cross feed with automatic retraction. Drive to the

spindle is by means of a flat belt and an adjustable idler. The maximum angle to which the workhead may be swiveled is 30 deg. The workhead clutch is operated by a hydraulic cylinder controlled by the table in place of the cam previously used. The No. 81 machine is fully automatic with the exception of loading the work and setting the grinding cycle. It can be arranged to size the work Sizematically or Gagematically, or if desired, a combination of the two methods.

Control, Internal-Grinder

Heald Machine Co., Worcester, Mass. (Vol.77,p.192.) 72.

No. 81 small internal grinder can be had with dual control; that is, employing the "Gage-Matic" and the "Size-Matic" principles. Gage-Matic sizing is done with solid positive gages working at the back end of the hole, and Size-Matic sizing where a taper hole or blind is encountered, when a

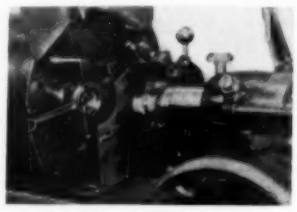


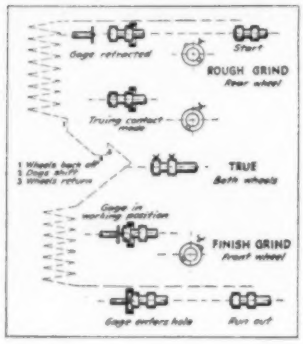
cross-slide and truing device adjustment is made use of. The plug sizing device is rendered inoperative when the machine is used as a Size-Matic by means of a gage throw-cut lever (left). The Size-Matic control mechanism is disconnected by lifting the bar which connects the feed box and the control box, and moving it to the right until a second notch engages the pin in the control lever.

Two-Wheel Cycle for Internal Grinders

Heald Machine Co., Worcester, Mass. (Vol.77,p.387.) 176.

Machines can be used in production with two wheels on the same spindle. With one automatic cycle, both rough and finish grinding with two wheels on the spindle can be done, and





with the other cycle grinding and polishing are performed. The accompanying sketch shows the sequence of automatic operation for the first case. This particular machine is arranged as a single "Gagematic" having a truing contact on the handwheel, "Sizematic" fashion, and the finishing contact in the plug sizing device. A special retraction mechanism is incorporated in the plug-sizing device to keep the gage retracted from the projecting wheel during rough grinding. To back off the cross-slide when the table runs out for truing, a lever is attached to the rear end of the cross-slide screw in such a manner that when the end of the lever is raised the slide backs off.

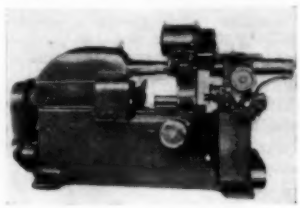
Where stock conditions are more nearly normal and the highest possible finish is desired, the two-wheel arrangement, one grinding and one polishing, is satisfactory. This method produces a finish nearly as smooth as that obtained by lapping, and at the same time maintains close tolerances for roundness and straightness.

Grinder, Internal, Semi-Automatic, No. 24

Bryant Chucking Grinder Co., Springfield, Vt. (Vol.77,p.768.)

Finish grinding of large work is the function of the No. 24 fully hydraulic, semi-internal grinder. This machine is suitable for grinding large and long bores in airplane cylinders, pulleys, gears and sleeves. Unusual length and diameter is given the work spindle to afford proper control for deep-hole grinding. The diamond holder, cross feed and wheel-slide lifter are controlled hydraulically, in addition to the traverse of the wheel-slide. These units are interlocked.

Specifications: swing, 21 in.;

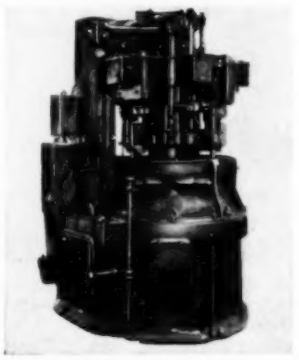


width of gap from work spindle nose, 16 in.; maximum stroke, 18 in.; grinding stroke, 14 in.; length over-all, 11½ ft.; width over-all, 4 ft.; speeds of work spindle with 4-speed, a.c. motor, 100, 150, 200 and 300 r.p.m.; speeds of work spindle with variable-speed, d.c. motor, 40 to 250 r.p.m.; net weight, 13,000 lb.

Grinder, Internal, Rotary, Multiple-Spindle

Baird Machine Co., Bridgeport, Conn. (Vol.77,p.193.) 63.

Internal grinding on a large quantity basis can be done with the multiple-spindle internal station-type grinder. The machine illustrated has eight spindles, of which six are grinding stations and two may be used as loading and unloading stations. Each wheel is automatically



dressed and sized. Speed and feed of each wheel is independent. Roughing and finishing wheels may be employed. Different diameters of holes may be ground at one set-up. The machine may be arranged to operate as a double-indexing type. Capacity, work up to 11 in.

Grinder, Internal, Rotary, Multiple-Spindle

Oakmont Mfg. Co., Vista, Calif. (Vol.77,p.736.) 366.

This continuous, multiple-station, rotary internal grinder can have a varying number of spindles. Each spindle grinds the piece from start to finish in one pass around the machine.

Speed of the machine is from 1 to 2 r.p.m. Arranged for either automatic or manual loading. In the course of the revolution, the motors and wheels are traversed vertically and fed horizontally into the work. The wheel is mounted directly upon the motor shaft. Chucks are driven by gearing and operated by cams to grip, release and change speed. Discharge and sweep-off are accomplished by cam action. A piece is turned out finished every 5 to 10 sec. but the actual grinding time on these pieces ranges from 22 to 45 sec.

Grinder, Surface, Hydraulic

Thompson Grinder Co., Springfield, O. (Vol.77,p.158.)

Complete hydraulic operation has been achieved. The line includes a 12x16x40 in. machine, an 8x12x24 in. machine and a 6x12x18 in. machine. A 12x16 x60 in. machine was also developed with a large diameter

grinding wheel for grinding dies from which guide pins have not been removed.

The 8x12x24 in. model is efficient as a toolroom or production unit. The head may also be moved by means of a hand-wheel on the wheelhead bracket. The 6x12x18 in. machine has automatic power cross feed as an optional feature and is generally intended for toolroom use where exceptional accuracy is required. In the grinding wheelhead, the motor-on-spindle feature eliminates vibration and delivers maximum power. Both intermittent and continuous hydraulic cross feeds are provided. Table speeds are 10 to 100 ft. per minute on all machines.

Grinder, Surface, Toolroom

Monarch Machine Tool Co., Sidney, O. (Vol.77,p.734.) 363.

Table traverse effected by an adjustable roller chain and sprocket is an innovation in this hand-feed, precision toolroom surface grinder. An inbuilt, motor-driven spindle with anti-friction bearings is furnished by the Ex-Cell-O Aircraft & Tool Corp. Automatic forced-feed lubrication is used for all bear-

ings, except the spindle bearings, which require special oil. Protection of sliding surfaces from abrasives is attained by a system of flat steel pieces. Specifications: Length of table travel, 18 in.; cross saddle travel, 6¾ in.; dimensions of table, 46x8 in.; working surface, 18x6 in.; standard wheel size, 7x1½x1¼-in. hole; vertical movement of wheel spindle, 9 in.; maximum distance from standard wheel to table, 9 in.

Grinder, Surface, 6x18-In.

Norton Co., Worcester, Mass. (Vol.77,p.764). 384b.

The 6x18 in. surface grinder is hydraulically operated and has an automatic cross feed. It is intended for tool and die shops or for light production

jobs on small parts. The plain-bronze or ball-bearing cartridge type spindle mounts an 8x¾-in. grinding wheel, driven by V-belts directly from the motor. Work-table surface is ground. Table travels at a maximum speed of 20 ft. per min. The automatic cross feed functions at each reversal or at alternating reversals and is adjustable from 0.010 to 0.090 in.

Grinder, Surface, Vertical, Hydraulic, No. 3-V

Gallmeyer & Livingston Co., Grand Rapids, Mich. (Vol.77, p.580.) 285.

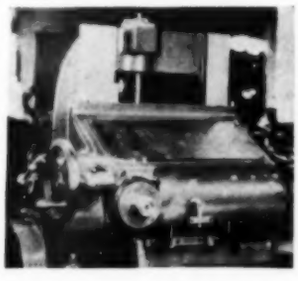
A cup wheel is used on the vertical spindle on the No. 3-V hydraulic-feed surface grinder, suitable for grinding dies with guide pins in place and also for miscellaneous toolroom

grinding. Table speeds 2 to 100 ft. per min. are available. Power rapid traverse and automatic down feed, variable from 0.0001 to 0.002 in. per stroke, with automatic throw-out are provided.

Wheelhead Reversing Mechanism, Surface-Grinder

Thompson Grinder Co., Springfield, O. (Vol.77,p.579.) 286.

A simplified form of reversing mechanism has been applied to the standard hydraulic surface grinder. Reversing dogs are adjustable to any cross feed stroke. Because it is also desirable to have manual control of the wheelhead reverse, a knob and dial on the front of the wheelhead bracket are provided. The reversing mechanism is inclosed within the head bracket.



Grinder, Camshaft, "Cam-O-Matic"

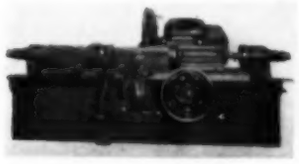
Norton Co., Worcester, Mass. (Vol.77,p.764.) 384e.

The "Cam-O-Matic" camshaft grinder automatically grinds all the cam contours on a camshaft. The machine employs a Type C wheel unit and can be used for either roughing or finishing. When the cam is ground to size the wheel moves back quickly and the table shifts, bringing the next cam into the grinding position and moving the master cam roller to the next master cam. These movements are repeated for each cam. Maximum swing is 6 in. in diameter over the rocking bar. Three standard lengths take 30, 36 and 42 in. between centers. Cams with a maximum lift of ¾ in. can be ground.

Grinder, Crankpin, Type D-85

Norton Co., Worcester, Mass. (Vol.77,p.764.) 384d.

The Type D-85 crankpin grinder swings 17 in. and is built in two lengths, 28 to 40 in., and 40 to 52 in. It uses the same wheel unit supplied

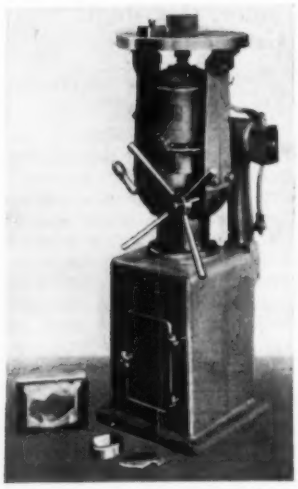


with 20 in. and larger Type D roll grinders. The grinding unit mounts a 42-in. grinding wheel as standard. The machine is of the double-head type, both heads driving the crankshaft. The left head is fixed longitudinally and has lateral adjustment while the right head is fixed laterally but is provided with longitudinal adjustment. Some form of grinding gage is ordinarily supplied, and the "Nortonizer" equipment may be had.

Grinder, Contour, No. 2

Baker Bros., Inc., Toledo, O. Vol.77,p.418.) 187.

A grinder for producing accurate contours or irregular shapes has the vertical wheel spindle driven from a vertical motor. The armature of the motor reciprocates by means of an independent motor and cam mechanism. Furthermore, the table is "in the clear" and the size of the work is not limited. A diamond dresser is furnished. No change is necessary for internal or external grinding, as the work is simply lifted over the wheel for internal grinding, but pressed against it for external grinding. A radius grinding attachment is of value in grinding convex radii on the end of a rectangular or square section stock, or special tool bits. Angle setting of the table



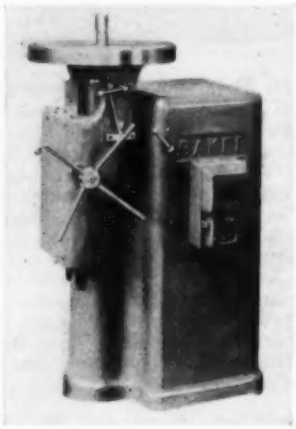
allows for grinding an angle on the radius.

Specifications: wheel ½ to 4 in.; face of wheel, 2 in.; table 15 in. in diameter; angle setting of table each side of center, 10 deg.; total reciprocation movement of spindle, ⅞ in.

Grinder, Contour, No. 3

Baker Bros., Inc., Toledo, O. (Vol.77,p.642.) 305.

For grinding and polishing of contours or irregular shapes, especially in die and tool shops, the No. 3 contour grinder is arranged with a vertical spindle

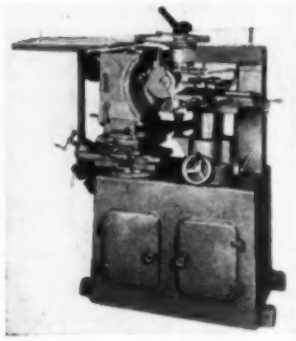


mounted on anti-friction bearings, and driven by V-belt from a motor at the rear. Three changes of speed are provided. The entire spindle assembly has an up-and-down reciprocating action to prevent shoulders on the wheel. The table is 18 in. in diameter, is mounted on a slide and can be set 10 deg. either side of horizontal for grinding angular relief.

Grinder, Profile, Improved

Geo. Scherr Co., 128 Lafayette St., New York, N. Y. (Vol.77,p.96.) 33.

Grinding form tools and gages directly from hardened steel can be done on the Naumann profile grinder. The position of the work slide allows



for grinding profiles 6 in. long on work pieces of any length. The side clearance motion can be set while the machine is running. Grinding wheel stroke is 2 in. vertically. Accurate grinding of the profile is secured by employing a drawing 50 times actual size and using a pantograph arrangement with a 50 to 1 ratio. The pantograph actuates a microscope having a magnification of forty times. The profile of the workpiece is thrown up on the microscope screen and the wheel is fed to the intersection of the cross hairs. As the pantograph is moved from point to point on the drawing the wheel is fed from point to point in the work. Design of the pantograph mechanism is such that 0.4 in. along the profile is ground. The drawing is made in sections. After 0.4 in. of the profile has been ground, another sectional drawing is placed on the table and the pantograph is returned to the initial position

Grinder, Knife, Automatic

Samuel C. Rogers & Co., 191-205 Dutton Ave., Buffalo, N. Y. (Vol.77,p.543.) 263.

Type M automatic knife grinder with electric time clock control and a reversible motor and grinding wheel is made in four sizes: 38, 55, 75 and 90 in. (or longer). It will grind light

shear blades and flat face or concave bevels. The grinding operation, including cross feeding and table reverse, is automatically controlled. The knife table is provided with clamps and bolts for holding knives and is fitted with knife gages to facilitate quick set-up. Standard equipment includes a centrifugal pump and valve for coolant.

Grinder, Slitter-Saw

Hanchett Mfg. Co., Big Rapids, Mich. (Vol.77,p.575.)

Metal-cutting saws from 2 to 5 in. in diameter can be sharpened or gummed singly or in gangs on the No. 21 automatic grinder. The machine will handle as many as 18 saws,

0.040 in. thick, 4 in. in diameter, 60 teeth. It will take tooth spacings up to ⅜ in., point to point. The wheel is shaped to sharpen the tooth points and gum the throats in one operation.

Grinder, Tube, Internal

Mattison Machine Works, Rockford, Ill. (Vol.77,p.836.) 433.

Internal grinding of tubes and pipes is done with a flexible, coated abrasive belt on the No. 424 tube grinder. The abrasive belt is threaded through the tube and made endless by a special removable splicing tape. Grinding pressure is secured by means of a pneumatic head attached to a hollow ramrod. The ramrod is power driven in both directions and has automatic reverse. The machine can be supplied to handle tubes ½ in. internal diameter and up and of practically any length.

Grinder, Toolbit, Three-Wheel

Sundstrand Machine Tool Co., Rockford, Ill. (Vol.77,p.737.) 374.

With the first speed combination, one spindle grinds high-speed steel tools; the second spindle, cemented carbides. With the second speed combination the speed of both the first and second spindles is suitable for grinding tungsten carbides. With the third combination the speed of the first

two spindles is suitable for grinding high-speed steel. The third spindle is equipped with a cast-iron disk for honing. Each table has a T-slot for clamping tools. Two 10-in. cup wheels are furnished. The disk for honing is 8 in. in diameter.

Lapping Machine, Toolbit, Carbide, Type D-4

Porter-Cable Machine Co. Syracuse, N. Y. (Vol. 77, p.451.) 206.

The machine employs "Carborundum Brand" finishing compound, grade R40 fine, less expensive than diamond dust, because the dull-lapped finish is satisfactory for this class of

work. The cast-iron lap leaves a dull-mat finish, whereas the wooden lap produces a semi-polish. The tool may be lapped freehand or it can be mounted in a sliding carriage.

Grinder, Toolbit, No. 150

Wells Mfg. Co., P. O. Box 613, Greenfield, Mass. (Vol.77, p.321.) 163.

Grinding and lapping of toolbits, either of high-speed steel or tungsten carbide, can be

undertaken. The machine consists of two units, one for grinding and the other for lapping. A special face-grinding wheel is in two parts, the outer ring being a coarse abrasive for the rough grinding, and the central section of finer grain for finish grinding. Shape of the tool is controlled by the form of a master block.

Grinder, Toolbit, No. 105

Carbide Engineering Co., 356 E. Congress St., Detroit, Mich. (Vol.77,p.671.) 333.

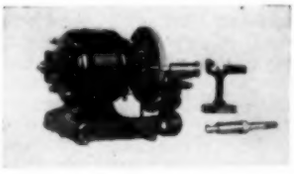
No. 105 grinder for sharpening tungsten and tantalum carbide tipped tools. The grinding wheel is of the ring type, mounted on a steel plate so

that the abrasive can be used completely. The diamond cutting plate is impregnated with diamond powder. Maximum clearance angle obtainable is 25 deg.

Grinder, Cutter, No. 130

Wells Mfg. Co., P. O. Box 613, Greenfield, Mass. (Vol.77, p.322.) 162.

Developed for sharpening routing cutters and engraving tools. The cutter, inserted in a quill, is set in the locator or gage block, aligning the quill by a pin entering a slot in the head. The end of the cutter locates

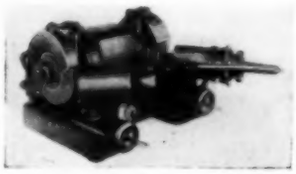


against the hardened gaging surface and the flat of the cutter will locate on the locator blade. The quill is then removed from the locator and placed in the workhead to be set to a dial.

Sharpener, Twist-Drill, No. 26

Wells Mfg. Co., Greenfield, Mass. (Vol.77,p.798.) 413.

Sharpening and rounding the corners of drills from 1 to 2½ in. is performed by the No. 26



drill sharpener, powered by ½-hp. motor. The drill is held in a double-end collet. At the right-hand end the drills are sharpened and given the proper eccentric relief. At the left-hand end the drills are rounded.

Buffer and Grinder, Variable-Speed

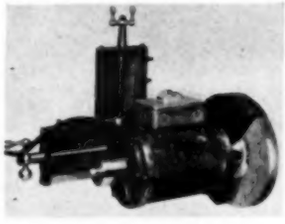
U. S. Electrical Tool Co., Cincinnati, O. (Vol.77,p.579.)

Model 95 buffer and polisher provides a selective gear drive which maintains an efficient peripheral speed for any diameter wheel. The drive provides four wheel speeds from 2,000 to 3,000 r.p.m. Speeds are selected by a lever mounted on the front of the machine.

Grinder, Auxiliary Angle-Plate

Standard Electrical Tool Co., Cincinnati, O. (Vol.77,p.351.)

The grinder is adapted for use on a lathe, planer, or boring mill, on a milling machine for grinding large cutters, and also



on shears for grinding large shear blades in place. Sizes: ½, 1, 2, and 3 hp. A 2-hp. outfit is fitted with horizontal feed of 11 in., vertical feed of 6 in., and 12x1½-in. wheel.

Grinder, Auxiliary, Precision

Hisey-Wolf Machine Co., Cincinnati, O. (Vol.77,p.799.)

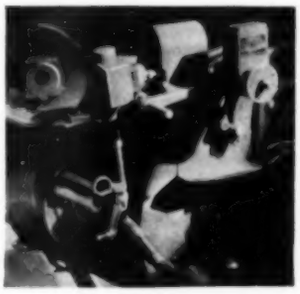
For use with lathes, boring mills, planers, milling machines, five sizes are built ranging from ½ to 5 hp. and using from 6x¾-in. to 12x2-in. face grinding wheels. Variable-speed V-belt drive is provided to the spindle. Because the spindle housing is small it is possible to get large wheel wear. On

most lathes any roll can be ground which can be swung over the carriage. A dovetail slide affords rapid adjustment of the wheel to the center of the work but does not affect the belt tension. The grinding spindle, together with the motor, can be swung end for end. Direction of rotation of the wheel is reversible through the motor.

Sizing Device, Grinding, Electrical

Norton Co., Worcester, Mass. (Vol.77,p.764.) 384f.

The gage rides the work as the grinding wheel feeds in. When the correct diameter is produced an electrical contact is made which stops the wheel feed and automatically lifts the gage from the work. The wheel remains in contact with the work for a very definite and minute period which is con-



trollable within fine limits, and the wheel then recedes rapidly to a position that facilitates rapid reloading of the machine. Inspection operations are eliminated for work that can be ground and finished to a total limit of 0.0003 in. No compensation for wheel wear is required.

The "Nortonizer" electrical sizing device can be applied to any new Norton cylindrical grinder and to practically all Type A or Type BA machines in service. Round work, splined work, keywayed work or partial-diameter work can be ground.

Sizing Device, Grinding, Air

Landis Tool Co., Waynesboro, Pa. (Vol.77,p.670.) 324.

External surfaces may be sized, whether they are straight, tapered, radial, splined, keywayed or only half diameters.

Internal surfaces sized are straight, tapered, splined, keywayed, interrupted or blind. The device also serves for radial internal surfaces, making it suitable for raceway grinding. Through the medium of a solenoid and hydraulic valves, the device can be made to control as many machine movements as necessary. It will size well within limits of 0.00025 in.

The principle—if air is escaping from a pressure line the pressure is affected by a change of the size and shape of the outlet. This change in pressure is used to actuate mercury in a U-tube in order to close contacts and to control the feeds and other machine movements. Shown is a typical external grinding sizing head. Air at from 2 to 20 lb. per sq.in. is used.

Spindle, Surface-Grinder, Motor-Driven

Ex-Cell-O Aircraft & Tool Corp., 1200 Oakman Blvd., Detroit, Mich. (Vol.77,p.259.)

An inbuilt, balanced, motor-driven grinding spindle designed for the "Abrasive" No. 3 surface grinder. Rating of the motor is 1 hp., and it can

be furnished for 220-, 440- or 550-volts, three-phase, 50- or 60-cyles. The grinding spindle portion of this unit has the same standard construction as all "Ex-Cell-O" spindles. Precision ball bearings are employed.

Spindle, Surface-Grinder, Motor-Driven

Ex-Cell-O Aircraft & Tool Corp., 1200 Oakman Blvd., Detroit, Mich. (Vol.77,p.739.)

An inbuilt, direct-motor-driven spindle offered as standard equipment for the Monarch No. 2 surface grinder. The

spindle is equipped with two Ex-Cell-O precision ball bearings. The motor is rated at 1 hp., 3,500 r.p.m., on 60-cycle, three-phase, 220-, 440- or 550-volt circuits.

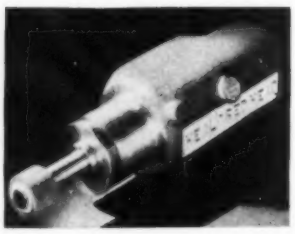
Wheel and Boring Heads, "Red Head"

Heald Machine Co., Worcester, Mass. (Vol.77,p.30.) 12.

These heads are for Heald internal grinders and boring machines. The old Types 21, 12, 18 and 20 are superseded

by Types 43, 45, 47 and 49. Corresponding types used on the No. 81 machine are 83, 85, and 87, which have bearings and quills interchangeable respectively with the 43, 45 and 47 types. The Type 81 is a new size capable of operating at speeds up to 42,000 r.p.m. for greater efficiency in small hole grinding.

Features of construction: special super-precision wheelhead bearings with Formica retainers; spindle supported on four rows of balls at all times; taper fit in solid cast-iron body;



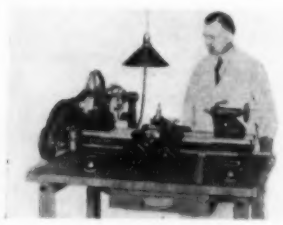
bearing sleeve held in a ground spindles and quills run true within 0.0002 in. at extreme end; naked, sleeve or quill-type spindles can be furnished.

Lathes

Lathe, Engine, 9-In.

South Bend Lathe Works, South Bend, Ind. (Vol.77, p.257.) 117.

The "Toolmaker" lathe is of the back-geared, screw-cutting type, and is mounted on pedestal style legs. It has a triple V-way bed and uses a ½-hp. motor to power a horizontal drive.



Mechanical features include a six-speed backgeared headstock, hollow spindle of alloy steel, felt-wick lubricated bearings, extra long carriage bearings, carriage lock for facing, graduated compound rest with micrometer collars.

Lathe, Oil-Country, Heavy-Duty

R. K. LeBlond Machine Tool Co., Cincinnati, O. (Vol.77, p.222.) 88.

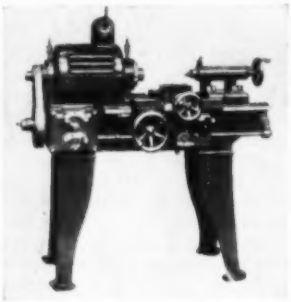
A heavy-duty lathe for the fabricator of equipment for oil drilling and for oil-field maintenance shops has a spindle with a bore of 10¼ in. and runs in large bronze, babbitt-lined bearings. The twelve-speed headstock has spindle reverse, selective speed change, continuous forced circulation of filtered oil, and all intermediate shafts mounted on anti-friction bear-

ings. All leads commonly required are obtained without the use of pick-off gears. The taper attachment is constructed for heavy work.

Lathe, High-Speed Production, 11-In.

R. K. LeBlond Machine Tool Co., Cincinnati, O. (Vol.77, p.229.) 87.

Application of the motor-armature-on-spindle principle to a high-speed lathe has resulted in a machine that can be brought up to 3,600 r.p.m. and stopped five times per minute. The lathe is intended for precision work and is suitable for turning small shafts. Both the

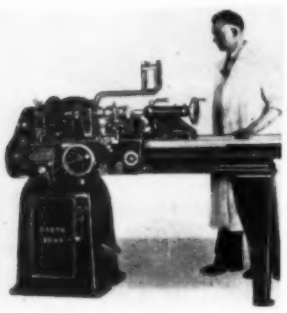


bed and carriage are high-strength nickel-iron castings. An automatic length stop can be furnished with the apron to stop the carriage within two or three thousandths thus making it possible to turn to a shoulder without using hand feed.

Lathe, Finishing, Cam-Piston

South Bend Lathe Works, South Bend, Ind. (Vol.77, p.383.) 191.

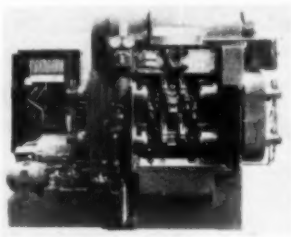
Designed to machine both round and out-of-round pistons, this lathe will service all cam-shaped pistons and can be set up quickly to finish pistons of practically any diameter, material or shape, and in straight or tapered types. The machine is a 13-in. underneath-belt motor-driven lathe with a cam forming unit mounted on the lathe carriage at the rear of the saddle. Machining is done with a tungsten carbide tool. The equipment is available in three sizes.



Lathe, Crankshaft, Dual-Spindle

R. K. LeBlond Machine Tool Co., Cincinnati, O. (Vol.77, p.481.) 236.

This machine can be used either for facing webs of all pins or turning the pin bearings on two crankshafts simultaneously. The machine may be arranged for either single-end or double-end drive. The stub end of the crankshaft in the single-end drive machine is supported by a heavy spindle carrying a roller - mounted hardened and ground sleeve which fits over th- line bearing.

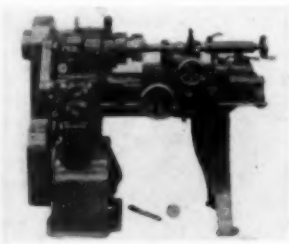


Stub-end spindles are moved into position and returned by means of hydraulic control. Cranks are further supported on one or more center-line bearings. Tool carriers are large cast-iron plates hung between two large master cranks. The tool blocks are arranged so that either horizontal or vertical tool units may be used.

Lathe, Elliptical-Turning

R. K. LeBlond Machine Tool Co., Cincinnati, O. (Vol.77, p.94.) 23.

Suitable for turning punches and mandrels or for boring elliptical holes. A standard 11-in., geared-head, rapid-production lathe is used as the basic machine. A splined shaft is geared to the spindle nose and is supported on the rear wing of the carriage. Carrier brackets are spaced on opposite sides



of the carriage bridge. The master cam is mounted between these brackets and is rotated by the splined shaft. The roller which contac-- this cam is mounted in a bracket in the center of the bottom slide. Any ellipse can be turned or bored by merely changing the cam.

Lathe, Automatic, 8-In., Fay

Jones & Lamson Machine Co., Springfield, Vt. (Vol.77 p.569.) 322.

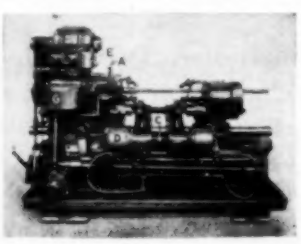
The 8-in. Fay automatic lathe —a light, flexible, universal machine completely automatic in its cycle—has all the tooling possibilities of the larger Fay lathes. Multiple tooling can be arranged on the carriage to turn various diameters, straight or taper. The back arm is arranged to face and form any

number of shoulder lengths or diameters. A third cutting head, or auxiliary attachment, can be installed for turning or facing. Six spindle speeds are in four optional groups. Six carriage feeds range from 0.004 to 0.040 in. per revolution. Two lengths—8x15 in. and 8x45 in.

Milling and Centering Machine, Double-End, Automatic

Janes & Lamson Machine Co., Springfield, Vt. (Vol. 77, p.287.) 130.

An automatic double-end milling and centering machine, which is offered for milling to length and centering to uniform depth both ends of shafts, stem gears and similar pieces preparatory to the turning operations, has a variable-speed headstock arranged for three speed changes. The right-hand milling head is adjustable on the ways. Both work supports are adjustable. All movements are controlled by hardened cams on cam drums, and the work-holding units are supported on a hardened and ground former

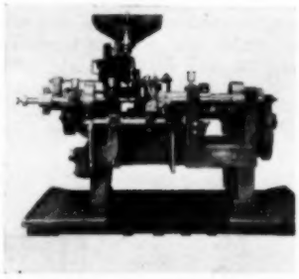


block. Maximum distances between the milling cutters are 20, 32, 44, 62 and 80 in. The standard V-blocks, cutters and cams are designed for round stock from ¾ to 3½ in. in diameter.

Screw Machine, Automatic, Hopper-Feed

H. P. Townsend Mfg. Co., P. O. Box 1206, Hartford, Conn. (Vol.77,p.447.) 221.

The machine can be furnished with several types of feed for feeding headed screw blanks, special rivets and studs, also straight blanks without heads, and small tubes or shells with



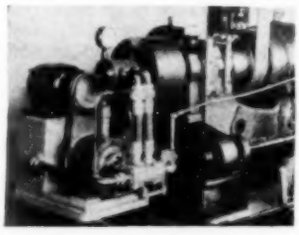
or without closed ends. The work spindle is of the two-jaw type. A finger feeds the blanks either head or point first into the spindle for pointing, shaving, drilling or hollow milling operations on either end.

The drill spindle is fitted with a chuck which will take ¼-in. drills. Cams for forming tool and the drill spindle are mounted on the left end of the camshaft and can be changed easily. The three sizes built handle work from the smallest up to 5 in. long by ⅜ in. in diameter. Production, 6 to 90 pieces per min.

Chuck-Operating Unit, Electric-Hydraulic

Tomkins-Johnson Co., Jackson, Mich. (Vol.77,p.609.) 302.

This electric-hydraulic chuck-operating unit is readily mounted on a machine and is capable of working pressure up

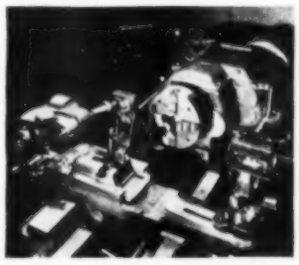


to 250 lb. per sq.in. Oil from the tank is pumped through a valve and distributor to the cylinder. To release the chuck a valve is caused to reverse the flow of oil. The motor is under load for short intervals.

Form Turning Device, "Centrode"

Monarch Machine Tool Co., Sidney, O. (Vol.77,p.162.) 41.

Turning, boring and facing shapes other than round—ovals, triangles, squares, hexagons and octagons, with sides either flat, concave or convex—can be done with the "Centrode Device." It can be applied to new Model "BB" lathes, 23 in. swing or larger. If the work is irregular in contour and is in shapes other than round, the Monarch-Keller automatic form turning machine (*AM*—Vol. 73, p. 873) in combination with the Centrode Device, will turn, bore or face the contour automatically, and at the same time produce the odd shape. The stroke capacity ranges from 0 to 2 in. An index plate makes it easy to set quickly the number of flutes or tool actuations per revolution of the spindle in divisions



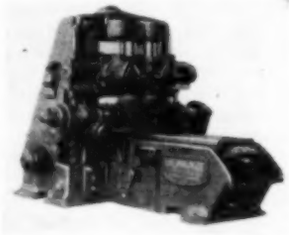
from 1 to 16. An oval chuck can be supplied for all sizes of Monarch lathes, including the Monarch - Keller form - turning machine to produce all classes of straight and irregular contour ovals on the respective machines.

Milling Machines

Milling Machine, Rail-Type

Kearney & Trecker Corp., Milwaukee, Wis. (Vol.77, p.701.) 355.

The rail-type milling machine is designed to use tungsten-carbide cutters to the utmost. It has a 22-, 30- or 42-in. table, and feeds of 7, 9 or 11 ft. Four spindles are furnished, two vertical on the cross-rail, and two horizontal, one each on the side housings. Each spindle has quill adjustment of 7 in. Separate spindle speed-change gears, giving 10 changes, and separate reverse gears are furnished. Any one of three



spindle speed ranges can be had: 20 to 135 r.p.m., 50 to 350 r.p.m. and 75 to 500 r.p.m. Two feed ranges, 18 changes: 1 to 40 in. per min. for spindle ranges of 50 to 350 or 75 to 500 r.p.m. and ½ to 20 in. per min. for spindle speeds of 20 to 135 r.p.m.

Distance from the top of the table to the vertical spindles is 0 to 25 in., and from the top of the table to the center line of the horizontal spindles, 0 to 19 in.

Milling Machine, Planer-Type, 120-In.

Wm. Sellers & Co., Philadelphia, Pa. (Vol.77,p.639.) 316.

This machine has four independent motor - driven unit heads and will accommodate work 120 in. by 90 in. by 29 ft.

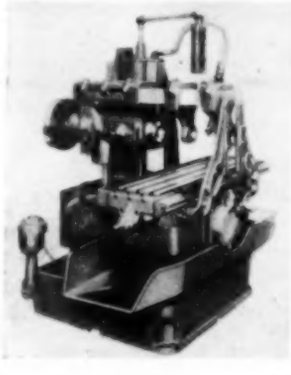
The table is of the double-plate type and is carried on a flat and combination double V - way. Powerful airlocks are used on the crossrail, which is of the extended back type. The table is driven by the company's familiar spiral gear drive.

Feed and traverse for the rail heads are obtained by an adjustable speed, d.c. motor and gearbox. A similar mechanism for the side heads is mounted on the cross girt.

Milling Machine, Manufacturing, "Rigidmil," No. 3-A

Sundstrand Machine Tool Co., Rockford, Ill. (Vol.77,p.767.)

The No. 3-A "Rigidmil" is a complete redesign of the No. 3. The table can be reciprocating (two lengths) or rotary (two sizes) and may have continuous feed or automatic alternating feed and rapid traverse. A heavy sleeve applies power close to the spindle nose, and the quill is longer and larger in



diameter. The arbor support braces are made with integral tenons. Spindle speeds available through pick-off gears range from 25 to 1,150 r.p.m. Six gears are furnished as standard equipment. Feeds range from 4.63 to 51.40 in. per min. A quick-change gearbox can be applied to the feed boxes for both spindle speeds and table feeds. They have direct-reading dials and provide twelve changes. Specifications: Table lengths, 50 and 62 in.; power feeds, 24 and 36 in.; table width, 14½ in.; top of table to center of spindle for medium- and low-speed heads, minimum, 3¾ in.; for high-speed heads, 4 in.; maximum distance, with standard column, 14 in.; with extended column, 18 in.

Milling Machine, Manufacturing, "Electromil," No. 1

Sundstrand Machine Tool Co., Rockford, Ill. (Vol.77, p.767.) 378.

The No. 1 "Electromil" milling machine is designed to use simple fixtures and to be quickly changed or set up. It can be used most effectively to secure low-cost production on parts manufactured in small quantities. Four horizontal plungers control electric circuits that energize solenoids to engage the feed or rapid traverse mechanisms or to reverse the

table drive motor. Changes in table movement can take place in rapid succession.

Feeds ranging from 1 to 80 in. per min. are secured through pick-off gears. Eight gears, providing a consecutive series of 25 feeds as selected are included in the standard equipment. Rapid traverse at the rate of 400 in. per min. is provided. Multiple-disk clutches submerged in oil engage the feed or rapid traverse without shock. Spindle and all fast-running shafts are mounted in anti-friction bearings. Eight spindle speeds range from 187 to 1,125 r.p.m.

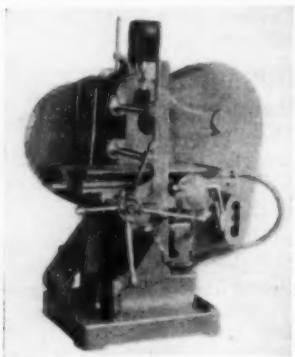
Specifications of the No. 1 Electromil: Longitudinal power feed, 12 in.; working surface of table, 9½x23 in.; vertical adjustment of spindle head, 5½ in.; distance, center line of spindle to table, minimum, 4 in.,

adjustment of spindle head, 3⅜ in.; distance, center line of spindle to underside of overarm, 4½ in.; distance, spindle nose to outer edge of table, maximum, 11½ in., minimum, 8⅛ in.

Milling Machine, No. 3 RV-DS

Kent-Owens Machine Co., Toledo, O. (Vol.77,p.704.) 350.

Center distance between the two spindles is adjustable, which, with the variable-spindle speed drive, fits this machine for handling a wide variety of operations. Ranges of spindle center distance available are

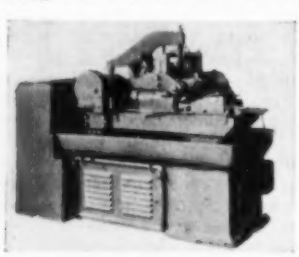


4¾ to 7⅞ in. and 5¾ to 9¼ in. Standard speed range is 58 to 174 r.p.m. Both spindles have a No. 10 B & S taper with a 17/32 in. clearance hole throughout. Table working surface, 28 by 7 in.; table feed, 17½ in., either by power or with a handwheel; cross saddle feed, 7 in.

Milling Machine, Cam-Type, Automatic-Indexing

Producto Machine Co., Bridgeport, Conn. (Vol.77, p.159.) 57.

A number of slots or surfaces on the periphery or face of a part can be milled on the No. 35 "Producto-Matic." This machine is supplied with a multiple headstock having two, three or four spindles. Maximum diameter of work accommodated is 4 in. The quick-acting tailstock is adjustable along the bed for the various

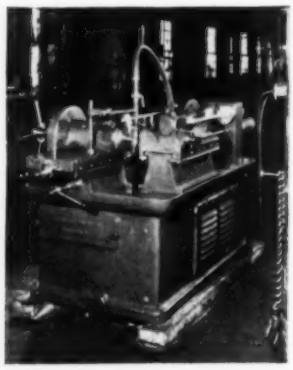


lengths of work. This machine provides a 5-in. horizontal and a 2-in. vertical stroke of the cutters, controlled by cams. Nine cutter speeds and nine feeds are obtained. Cutter spindle speeds range from 42 to 500 r.p.m.

Milling Machine, Cam-Type, Automatic, No. 12½

Producto Machine Co., Bridgeport, Conn. (Vol.77, p.291.) 150.

Two paths, surfaces or contours can be milled on the same piece simultaneously. Separate master cams are used to control the action of the two cutter slides. Each cutter spindle is



driven by a worm and worm gear that derives its power from the main gearbox. Pick-off gears are provided to control the feed required. The work spindle can be changed by pick-off gears. Work is clamped by a handwheel or by means of air chucks.

Milling Machine, Drum-Type, Newton

Consolidated Machine Tool Corp. of America, Newton Div., Rochester, N. Y. (Vol.77, p.351.) 175.

A drum-type milling and center drilling machine for rapid production of work required to be faced and center drilled on both ends, the machine illustrated has capacity for work from 6 to 30 in. in length, but other machines handle up to 72 in. The machine operates continuously. Clamps holding the work on

the drum are tightened automatically as the drum revolves. Production, 300 to 400 pieces per hr.

Milling Machine, Continuous, Planetary

Hall Planetary Co., Fox St. and Abbotsford Ave., Philadelphia, Pa. (Vol.77,p.319.) 166.

Operations classified under circular milling and thread milling can be done on standard parts at a high rate of production. At 2 r.p.m. of the machine, 12 pieces of work are produced per min. Accuracy of plus or minus 0.00025 in. is guaranteed. The machine is an adaptation of the standard horizontal single- and multiple-head planetary milling machines. It is also unnecessary to stop the machine to locate the work with respect to the cutter, or to replace cutters.

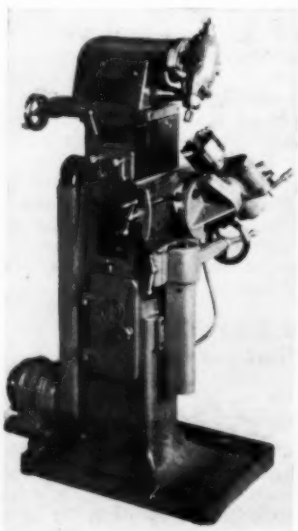
The machine is designed for automatic loading from a conveyor. Chucking fixtures directly beneath each planetary head automatically chuck and locate the work. The six milling spindles are driven by individual vertical motors through silent chain drive. Fixture throw-outs are individually controlled.

Milling Machine, Tool, Universal

Index Machinery Corp., 49 Central Ave., Cincinnati, O. (Vol.77,p.737.) 380.

The vertical milling head is mounted in the same bearing as that used by the prism-shaped overhanging arm, and the drive for the vertical head is through a gear directly from the center of the main horizontal spindle. The machine will do both horizontal and vertical work.

The universal horizontal table swivels in four directions. The dividing head may be mounted in the horizontal or vertical positions, and is equipped with an

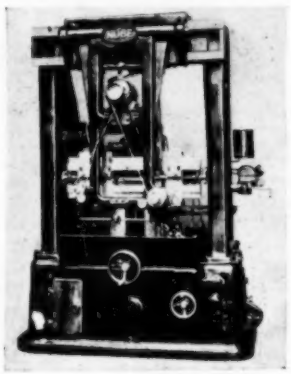


overhanging arm or arbor support for use when milling reamers, taps and gears. Automatic feeds in six changes are provided for both the vertical and horizontal movements. The vertical head spindle and the dividing spindle are bored No. 4 Morse, the same as the main horizontal spindle.

Die-Sinking and Copying Machine, Automatic, Model AGF

Hisgen-Nube Machine Co., 117 W. Lake St., Chicago, Ill. (Vol.77,p.322.) 167.

For the manufacture of drop-forging and embossing dies and of molds for plastics and die-casting, the Model AGF automatic die-copying and die-sinking machine copies from an old die or from a model in the ratio

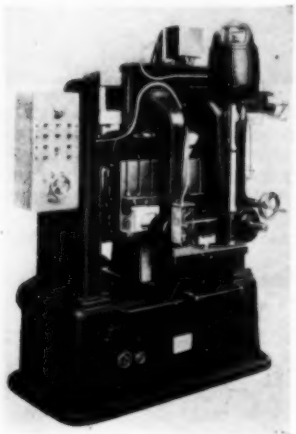


of 1:1 and to a maximum size of 16½x8 in. It is possible to use very fine pointed milling cutters. The automatic longitudinal and vertical feeds are adjustable in four steps. The collet chuck takes up to ⅜ in. diam. tools.

Die-Sinking and Profiling Machine, Automatic

Hisgen-Nube Machine Co., 117 W. Lake St., Chicago, Ill. (Vol.77,p.386.) 189.

This machine is specially constructed for large and heavy work on blanking and forming dies, bakelite and die-casting molds, and will reproduce from a soft pattern or model or from

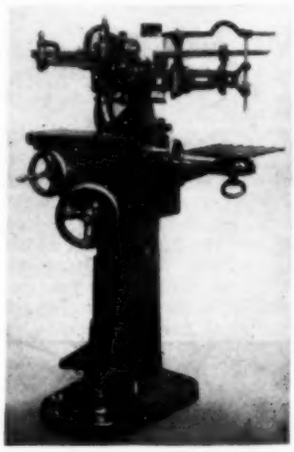


a templet. The copying mechanism works in a ratio of 1-1. All motions are effected by special reversing motors incorporating a dynamic brake. All motions can be automatically controlled. Four sizes of machines are built. Capacity of the first: length of die, 16 in.; width, 12 in.; thickness, 12 in. —the largest, length of die, 75 in.; width, 36 in.; thickness, 26 in.

Engraving and Die-Sinking Machine, Universal

Hisgen-Nube Machine Co., 117 W. Lake St., Chicago, Ill. (Vol.77,p.674.) 323.

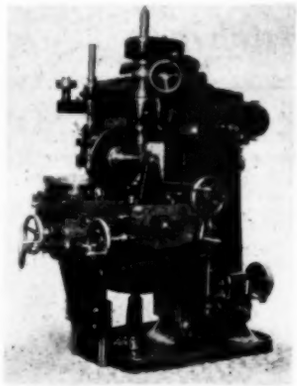
The Marquette No. H-3 engraving, diesinking and profiling machine operates in three dimensions for cutting molds and dies. A full-sized or enlarged model is mounted on the tracing table at the right. The dieblock is mounted on the work-table at left. A two-dimensional pantograph controls the cutter.



Copying Machine, Die, Vertical

Hisgen-Nube Machine Co., 117 W. Lake St., Chicago, Ill. (Vol.77,p.416.) 203.

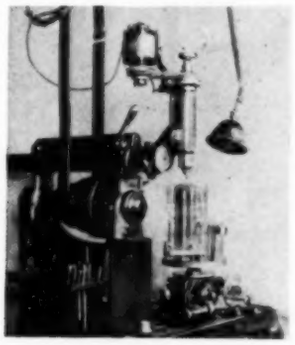
No. KF-3 vertical copying machine is suitable for cutting dies and cams from an enlarged or original copy. The machine can be arranged for cutting face-cams with the aid of one circular table when an enlarged pattern is employed, or for cutting such work with a special apparatus placed beside the circular table. The milling spindle and tracer are mounted on the horizontal slide, and are adjusted independently, either horizontally or vertically. Face-cams up to 20 in. in diameter may be cut in a 1-1 ratio, but enlarged patterns up to 50 in. in diameter can be employed.



Milling Head, Universal

Eklind Tool & Mfg. Co., 649 W. Washington Blvd., Chicago, Ill. (Vol.77,p.417.) 208.

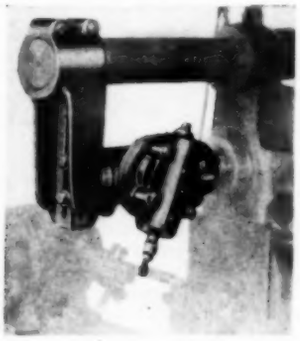
The device is satisfactory for such operations as routing, engraving, filing, grinding and finishing on molds, dies and metal patterns. Mechanical features: Motor may be swung for use on either right or left side; double ball thrust bearing on draw screw for tightening or releasing collet; full-length steel sleeve holds SKF spindle bearings in alignment; V-belt drive; ball-bearing motor; hardened and ground tool-steel spindle and collet of special design to eliminate cutter slippage; ½-hp. motor.



Milling Attachment, High-Speed

Porter-Cable Machine Co., Syracuse, N. Y. (Vol.77,p.795.)

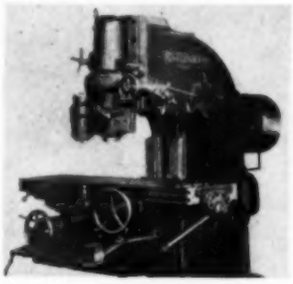
The attachment is held rigidly by the overarm clamp regardless of the position of the cutter, and is driven by the spindle of the milling machine to provide a spindle speed 2½ times as great. The unit is furnished with either a No. 9, 10, or 11 B. & S. taper drive arbor. The spindle of the attachment itself has a No. 7 B. & S. taper for milling cutters of any description.



Spindle, Milling-Machine

Cincinnati Milling Machine Co. & Cincinnati Grinders, Inc., Cincinnati, O. (Vol.77,p.480.)

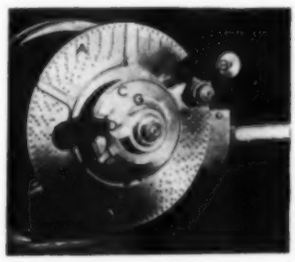
The No. 4 vertical "High Power" milling machine can be furnished with an auxiliary spindle head for the purpose of die-sinking. The spindle swivels 90 deg. either side of vertical. The attachment is assembled on a boss cast integral with the regular vertical-head slide casting. Drive is obtained from the main spindle through bevel gears. The auxiliary spindle is equipped with a No. 11 B. & S. taper. Distance between the auxiliary and the regular spindle centerlines is 8½ in. Sixteen spindle speeds from 17 to 480 r.p.m. are provided.



Dividing Head, Milling Machine, "Wide-Range"

Cincinnati Milling Machine Co. & Cincinnati Grinders, Inc., Cincinnati, O. (Vol.77,p.415.)

The "Wide Range Divider" is for use with the company's universal dividing heads for rapidly selecting divisions from 2 to 400,000 and any angle in degrees, minutes and seconds with the dividing head spindle set at any angle from 10 deg. below the horizontal to 50 deg. beyond the vertical. Spiral gears can be indexed. This arrangement is a compact, self-contained unit built into the dividing head and consists of the large index plate *A*, sector and crank *B*, together with a small index plate *C*, and sector and crank *D*. The mechanism is so arranged that small crank *D* operates through a reduction gearing of 100 to 1 ratio inclosed in the housing *G*. Ratio between the dividing head worm shaft and spindle is 40 to 1.



Presses

Presses, Double Crank, with Solid Frame

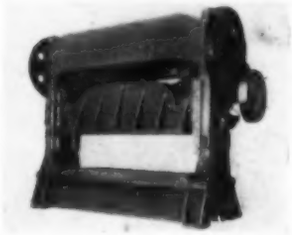
Allsteel Press Co., 12015 S. Peoria St., Chicago, Ill. (Vol. 77,p.384.) 183.

"Verson" double-crank presses with solid frames are built in all sizes and capacities and also to suit the user's particular requirements. They are of welded steel-plate construction, require no pit and are accessible all around. The friction clutch and brake are air-operated and are mounted between the housings, together with the motor and drive. The high-speed backshaft runs in roller bearings.

Presses, Double-Crank, Straight-Side

Allsteel Press Co., 12015 S. Peoria St., Chicago, Ill. (Vol. 77,p.29.) 11.

Welded-steel construction is used. Illustrated is a "Verson" press of 350 tons capacity with 48x140-in. bed area, 48x132-in. area of slide flange, 10-in. stroke, 20-in. shut height, 154-in. height over-all. It occupies 82x190 in. of floor space and

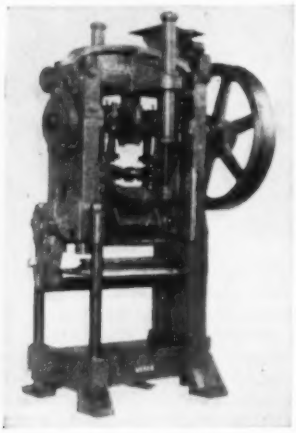


weighs 100,000 lb. The press is double geared and has twin drive and two balance wheels. The frame is built flush with the floor, no pit being necessary. The backshaft runs in roller bearings and lubrication is provided by two force-feed units.

Press, Horning, Double-Crank

Niagara Machine & Tool Wks., Buffalo, N. Y. (Vol.77, p.228.) 110.

This double-crank press is equipped with a duplex side seaming horn for making hooks and closing the side seam of drum bodies. The adjacent edges of body cylinders are folded, one up and one down,

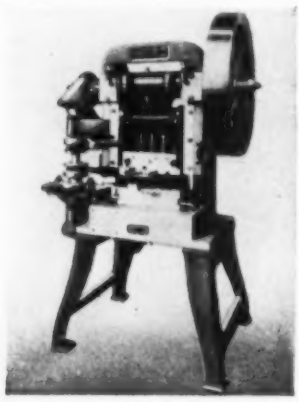


in the first stroke of the press slide. In a second stroke, the previously assembled hooked edges are bumped together. The closing or bumping tool is made with provisions for offsetting the seam either inside or outside. Similar equipment with a suitable horn produces the Gordon or compound side seam.

Press, Multiple-Transfer, Automatic

Baird Machine Co., Bridgeport, Conn. (Vol.77,p.702.) 341.

Work produced from coil stock can be transferred to several positions after blanking for the purpose of piercing, forming one or more times, lettering and embossing operations on this multiple-transfer press. The blank is securely held as it is

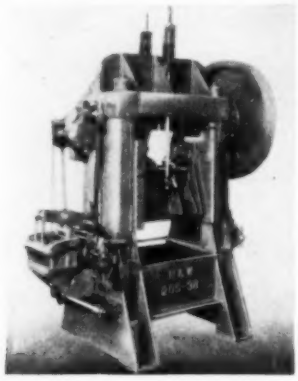


carried down through the die into the transfer fingers by the transfer mechanism. The transfer fingers retain a grip on the work until the forming of other tools takes hold, and the work is again gripped by the next transfer finger before the tool lets go. All the punches or ram tools are contained in one punch holder.

Presses, Automatic, Welded-Steel

Henry & Wright Mfg. Co., Hartford, Conn. (Vol.77,p.703.)

A line of automatic presses embodying welded-steel construction and various automatic features typical of its dieing machines has been placed on the



market. A spring counterbalanced slide, positive clutch, releasing brake, together with single and continuous operating lever, are provided. Automatic double-roll feeds are included.

Press Punch

Service Machine Co., 745 Broadway, Elizabeth, N. J. (Vol.77,p.479.) 228.

A 10-ton, welded-steel-frame press, No. P-13A, is a high speed machine operating at a maximum speed of 250 r.p.m. It is designed for medium punching and stamping operations, while its deep-throat design permits handling work of large area. Depth of throat is 8 in. as standard. The slide is 3½ in.

from front to back and 7½ in. between the gibs. The eccentric can be quickly interchanged for various lengths of stroke to a maximum of 1½ in. Bolster area, 15x11 in.

Presses, Hydraulic, Self-Contained

Hydraulic Press Mfg. Co., Mt. Gilead, Ohio. (Vol.77,p. 577.) 274.

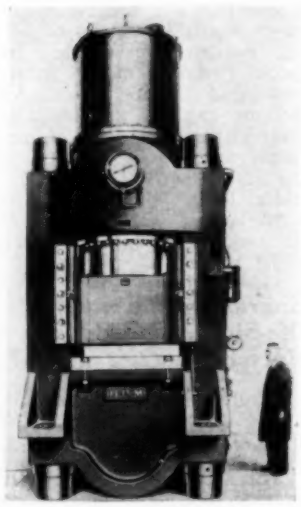
This hydraulic, platen press of the upward-acting type of press frame has its own individual hydraulic power plant. The "Hydro-Power" unit can be mounted in any convenient lo-

cation adjacent to the press. The pressure and speed of ram travel are subject to close automatic regulation. Standard capacities, 25 to 500 tons.

Press, Stamping, Hydraulic Production

Hydraulic Press Mfg. Co., Mt. Gilead, O. (Vol.77,p.416.)

A hydraulic press for sheet-metal stamping, forming, embossing and similar die work is entirely self-contained. The direct electric motor-driven pump is mounted across the rear of the press head. An overhead tank contains the supply of oil employed as the pressure fluid and lubricant. Operating flexibility is attained with the various controls supplied, which include automatic adjustable pressure regulation and variable stroke and die shut height. The pressing cycle may be carried out in complete automatic se-

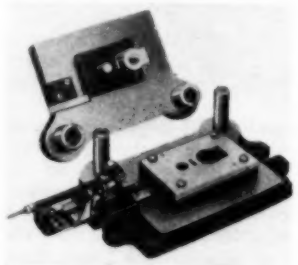


quence, making either single strokes or running continuously. Standard sizes, 100 to 2,000 tons.

Hitch Feed, Press

Producto Machine Co., Bridgeport, Conn. (Vol.77,p.419.) 209.

The "Dickerman Hitch Feed" is attached to the die-holder of any type of die set and consists of an operating cam attached to the punch holder and a feeding mechanism attached to the die-set base. On the downward stroke of the press the cam rides on a hardened roller and stud which forces the feed slide



back. On the upward stroke, a release spring functions so that the stock is pushed through the die to the required stroke. The feed is adapted to all types of presses having a 2 in. stroke. Length of feed is adjustable from 1/64th to 2 in. Stock thicknesses handled range from 0.005 to 0.125 in.

Shearing Machines

Shears, M Series

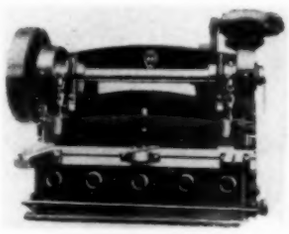
Niagara Machine & Tool Works, Buffalo, N. Y. (Vol.77, p.451.) 216.

Semi-steel castings made in heavily ribbed and filleted sections form the housings. The box-section crosshead is counterbalanced by air cylinders. Each foot of the patented holddown is arranged with an individual spring cushion. By the use of an independent chuck for the lower knife it is possible to locate the bed permanently and to facilitate knife adjustment.

Shear, Squaring

Schatz Mfg. Co., Poughkeepsie, N. Y. (Vol.77,p.256.) 118.

A "compensating" drive permits instantaneous stopping of the slide at any point of the stroke and its return. Thus, a plate can be cut into as far as desired. A beveling attachment cuts V or modified V welding edges. When trimming a nar-



row strip from a long plate, the side shear snips off the trimmings at the end of each stroke and facilitates further feeding. The automatic plate hold-down is self-regulating to the thickness of plate. Machines with the friction-disk clutch are available in 80 sizes, while smaller shears with the steel-bolt clutch may be had in 26 sizes.

Shear, Blanking, Automatic

Brown & Co., R. H., New Haven, Conn. (Vol.77,p.355.)

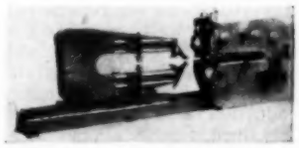
For blanking hacksaw blades and similar articles, this automatic blanking machine is belt-driven but can be motor-driven. Stock ranging from 0.010 in. to 0.031 in. thick and from ⅜ to 15 in. wide by 24 in. long can

be handled. The machine will hold 200 sheets of 0.025 in. thickness at one setting. Sheets are loaded by hand and are automatically fed to jaws which carry them through the blanking operation. Speed of the machine is 110 to 120 r.p.m. The table has an adjustable feed and can be adjusted to different sizes of stock.

Shear, Rotary, Welded Steel

Quickwork Co., St. Marys, O. (Vol.77,p.579.) 278.

Flanged and elliptical heads ordinarily made manually or on a large press can be produced on the No. 230 rotary shear. As a consequence of welded steel construction the company can furnish a machine to fit the cus-

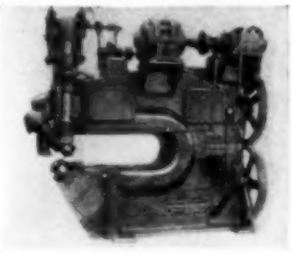


tomer's particular requirements, where one of the company's standard machines is not suitable. Capacity of No. 230 shear, ⅜ in. mild steel. It will flange ¼ in. mild steel and 10-gage corrosion-resisting steels. The shear will make straight and irregular cuts and will cut square or beveled edges. It will split wide sheets or narrow strips on the edge of sheets.

Shear, Rotary

Williams, White & Co., Moline, Ill. (Vol.77,p.799.) 375.

Straight lines, circles and irregular curves in ¾-in. mild steel plate can be cut to the center of a 96-in. circle. Three speeds are provided. The cutters are driven from a motor mounted overhead. The upper cutter



head has adjustment for taking up wear and is moved downward and held by means of a hydraulic cylinder. For feeding the head down, when cutting holes in the inside of a sheet or when flanging, the head is brought down to the proper cutting position by means of a feed control valve.

Shear, Circle, Mill-Type

Quickwork Co., St. Marys, O. (Vol.77,p.800.) 416.

Circles up to 96 in. can be cut in mild steel plate up to ½ in. thick on this mill-type circle shear. Travel of the plate is 75 ft. per min. Cutters run con-

tinuously. The upper cutter is raised and lowered by a crank actuated by a swinging member. A 15-hp. motor drives is machine. The square plate is clamped pneumatically in the circle-cutting attachment, and a round head with a clean edge is cut without having first to cut off the corners of the plate. Major parts of this shear are constructed of arc-welded steel plate. All shafts, with two exceptions, are mounted on anti-friction bearings.

Metal Cutter, 36-In. Throat

Gray Machine Co., Box 596, Philadelphia, Pa. (Vol.77,p. 610.) 303.

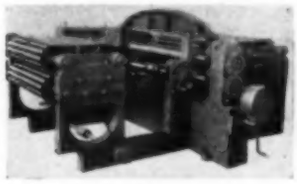
This turret head metal cutter has a 36-in. throat with capacity for cutting ⅜-in. mild steel at 30 ft. per min., cutting anywhere

in sheets 6 ft. wide and of any length. The turret turns for cutting various shapes in large sheets. Two flywheel speeds take care of light and heavy stock.

Shear, Slitting, Conveyor-Type

Streine Tool & Mfg. Co., New Bremen, O. (Vol.77,p. 735.) 370.

A continuous-hold-down, conveyor-type slitting shear will handle sheets 38, 50, 62 or 75 in. in width and is designed for four sizes of cutters, 8, 12, 15 and 20 in. in diameter. A ball-bearing roller feed table with a



quickly adjustable side gage is available. The sheet passes between two tracks of a conveyor. Provision is made so that the axes of the cutter shafts are always parallel. Anti-friction bearings support the cutter arbors, being mounted in eccentric sleeves and adjusted vertically by means of a worm and gear.

Other Machines

Beading and Trimming Machine

McKinney Tool & Mfg. Co., 1588 Arabella Rd., Cleveland, O. (Vol.77,p.226.) 94.

Medium and large-size drawn shells can be trimmed. The drawn shapes do not necessarily have to be round. The front vertical roll is mounted on a saddle for separation of rolls and admission of work. With

the rolls together, the cut starts immediately and the work revolves on the table until the cut is completed. Rolls can be run at a speed of 40 to 60 r.p.m. for beading stock up to 18 gage or for trimming stock up to 16 gage. Drive is through a V-belt or silent chain from a motor at the back.

Bending Roll, Plate

Marburg Bros., Inc., 90 West St., New York, N. Y. (Vol. 77,p.353.) 155.

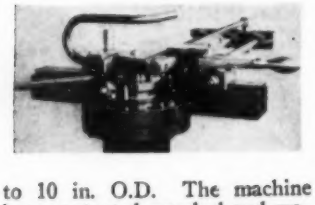
Plates up to 28 ft. long and 1¼ in. thick, having a tensile strength of 70,000 lb. per sq.in., can be handled on the Wagner bending roll of the 3-roll type. The minimum diameter to which the plate can be bent is

41 in. A 170-hp. reversible motor provides power for driving the rolls, a 110-hp. motor tilts the upper roll, and a 6-hp. motor operates the device which disengages the outer bearing from the upper roll.

Bending Machine, Tube, "Climax"

Schatz Mfg. Co., Poughkeepsie, N. Y. (Vol.77,p.545.) 255.

The Climax tube-bending machine is offered in hand- or motor-driven types for cold bending steel and non-ferrous tubes, the largest capacity being for steel tubes up to 8 in. O.D. and non-ferrous tubes up



to 10 in. O.D. The machine has a patented mandrel and machine release and can bend to a radius of 1½ times the outside diameter of the tube, measured to the center of the tube. All segments are arranged for bending up to 180 deg.

Brake, Press

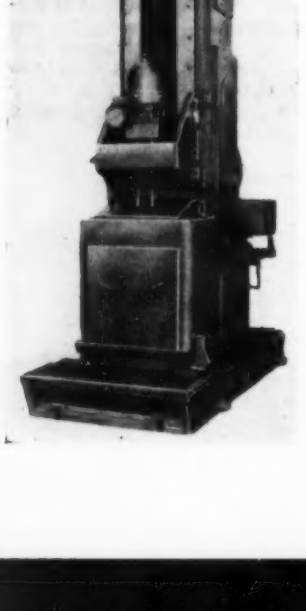
Whitney Metal Tool Co., Rockford, Ill. (Vol.77,p.99.) 56.

The stationary member is at the top, whereas the slide is below. Two coil springs balance the weight of the lower mechanism. The machine can be converted in from 10 to 15 minutes to a box or pan brake as well as a bending brake. A box finger at one end of the machine will make any desired pan or box within the limits of the machine by attaching various fingers to the platen. The machine is built mainly of steel and takes care of thicknesses up to 16 gage.

Broaching Machine, Hydro-Mechanical, Type HM-52

American Broach & Machine Co., Ann Arbor, Mich. (Vol. 77,p.771.) 404.

The advantages of hydraulic and mechanical operation have been combined in the Type HM-52 broaching machine. One feature is a cushioning device or hydraulic shock absorber that is automatically controlled. Thus, the broach has an opportunity to hesitate slightly as each tooth enters and leaves the work, giving a cushioning action. By opening the relief valve and locking the device, it is possible to operate the machine the same as a regular mechanically operated type. This is desirable on heavy cuts. The machine is provided with the usual lower hydraulic elevator for raising the broach as on all the company's machines. Specifications: maximum length of broach, 52 in.; largest diameter of work, 13 in.; maximum pulling capacity, 18 tons.



Broaching Machine, Surface, Horizontal

Foote-Burt Co., Cleveland, O. (Vol.77,p.794.) 417.

This type of machine lends itself to the use of an unusually long broach which provides many teeth for removing the metal and makes possible almost any desired quality of finish. A slow cutting speed of 25 ft. per min. provides economical broach life. Three sizes of this machine are available. Smooth

drive to the chain carrying the work fixtures is assured by transmitting power from the motor through a worm and worm gear reduction and then through a helical gear reduction to the driving sprocket. The fixture tunnel on the top of the bed has tool-steel guides and provides solid support during broaching. Usually the fixtures are of the automatic clamping type. After the fixtures pass through the broach cut, they are released automatically by a cam at the unloading position.

Broaching Machine, Surface, Vertical

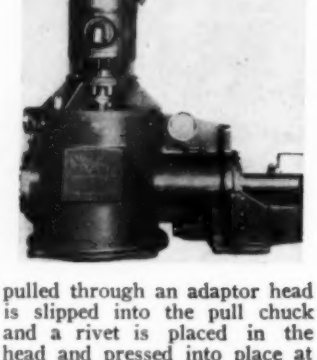
American Broach & Machine Co., Ann Arbor, Mich. (Vol. 77,p.830.) 429.

This machine is set up for broaching two flats on each end of a shackle pin used on one of the new axleless cars. In machining this part it is essential that the flat surfaces be parallel within 0.001 in. lengthwise of the pin as well as at right angles to the pin. The machine has a stroke sufficient to operate broaches up to 44 in. in length. Production of 300 pins per hour is obtained. Specifications: Motor required, 25 hp., 1,200 r.p.m.; pulling capacity, 18 tons; height, 136 in.; weight, 10,600 lb.; floor space, 38x104 in.

Broaching Machine, Horizontal, Special

American Broach & Machine Co., Ann Arbor, Mich. (Vol. 77,p.832.) 430.

Furnished to the contractor for the penstocks at Boulder Dam this special pull-broaching machine is used in the assembly of the penstock section. It is designed for pull-broaching the hole in the outer band and the tube proper at each joint. Immediately after the broach is

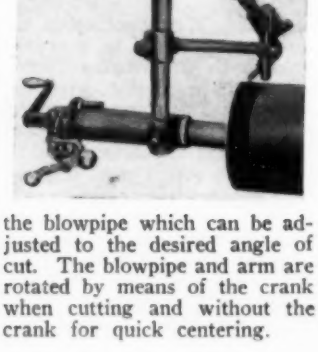


pulled through an adaptor head is slipped into the pull chuck and a rivet is placed in the head and pressed into place at a pressure of 40 tons. Capacity: pulling up to 35 tons; pushing up to 40 tons.

Cutting and Beveling Machine, Pipe, "Oxweld"

Linde Air Products Co., 30 East 42nd St., New York, N. Y. (Vol.77,p.803.) 408.

The machine consists of a center rod with three spreading arms that press against the inner wall of the pipe, holding it in position. An arm supports

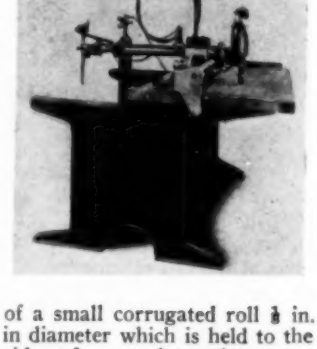


the blowpipe which can be adjusted to the desired angle of cut. The blowpipe and arm are rotated by means of the crank when cutting and without the crank for quick centering.

Cutting Machine, Shape, Flame, Toolroom Type

American Oxycop Co., Niagara Falls, N. Y. (Vol.77,p. 672.) 319.

For cutting large and small dies, this machine has a cutting capacity of 24x18 in. by 8 in. thick. The motor-driven head is fitted with a small tracing wheel. A second device consists

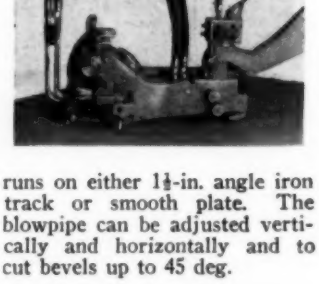


of a small corrugated roll ⅜ in. in diameter which is held to the sides of a wood templet to assure accuracy and close cutting. A third device is the double roll that is used with a metal templet (actual size) and works automatically.

Cutting Machine, Shape, Flame, Portable

Linde Air Products Co., 30 E. 42nd St., New York, N. Y. (Vol.77,p.706.) 336.

The "Secator" machine consists of an Oxweld Type C-14-H blowpipe mounted on an electrically driven, air-cooled, dustproof chassis. The machine

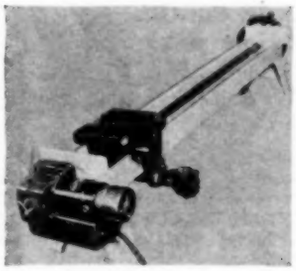


runs on either 1½-in. angle iron track or smooth plate. The blowpipe can be adjusted vertically and horizontally and to cut bevels up to 45 deg.

Cutting Machine, Flame, Straight-Line

Linde Air Products Co., 30 E. 42nd St., New York, N. Y. (Vol.77,p.798.) 376.

Machine consists of a steel channel supporting base, a means for moving the blowpipe and adjustments for setting the blowpipe to cut bevels. Motion in two directions is possible: 45 in. longitudinally and 7¾ in. laterally. The machine can be furnished either with two traverse handwheels for hand operation, or one handwheel and

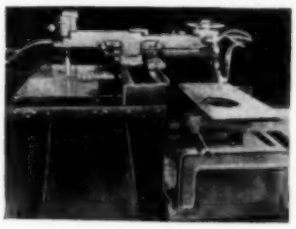


a 110-volt universal motor. The speed of the machine is approximately 35 in. per min. A reverse switch permits motion in either direction.

Cutting Machine, Shape, Flame, Precision

Linde Air Products Co., 60 E. 42nd St., New York, N. Y. (Vol.77,p.833.) 438.

The "Pantosec" precision shape-cutting machine is suitable for cutting dies, cams and other parts. The cutting range is 44 in. longitudinally and 20 in. laterally. Straight-line cutting, angle cutting, beveling, circle cutting and intricate

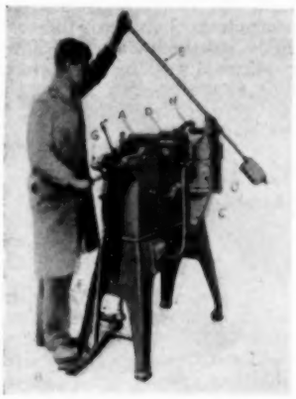


shape-cutting can be done. Floor space is approximately 72x83 in. The Pantosec can be operated from either the templet end or the blowpipe end, and as a hand-guided or machine - guided instrument. The dividing head enables the operator to set stops on work that is to be cut in several directions.

Die-Casting Machines, "Kipp-Caster"

Madison-Kipp Corp., Madison, Wis. (Vol.77,p.192.) 75.

The No. 15 is intended for the production of zinc, lead and tin alloy parts. The No. 26 machine is a combination of the No. 11 (earlier) and No. 15.

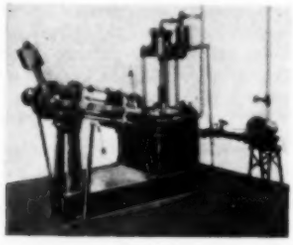


The No. 15 machine is a side-shot type and is equipped with an electrically heated metal pot and a plunger-loaded, metal-pressure gooseneck. This machine is semi-automatic in operation. Core pulls are either automatic or hand-operated and casting ejection is automatic. Three to eight shots per minute have been regularly maintained. Standard die size is 6x6x3 in. thick. The metal pot holds 65 lb. of zinc alloy. A standard plunger will cast up to 1½ lb.

Die-Casting Machines

Newton - New Haven Co., New Haven, Conn. (Vol.77,p. 479.) 222.

Hand-operated, semi - automatic and full automatic die-casting machines that employ the positive-plunger injection principle are available for short-run or continuous operation. On the semi - automatic machine production of 400 to 500 shots

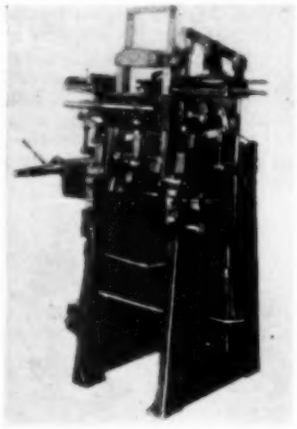


per hr. on short runs or 600 to 700 shots per hr. on continuous runs has been obtained. All machines will take dies up to 9x12 x9½ in. All major castings are of steel. Other stressed parts are of steel shapes or forgings. Welding is freely used. In the hand and semi-automatic models the dies are closed by hand.

Die-Casting Machine

Kux-Lohner Machine Co., 2145 Lexington St., Chicago, Ill. (Vol.77,p.673.) 325.

Lead, zinc-base and aluminum alloys are handled by the plunger method with adjustable pressure back of the plunger of 50 to 1,500 lb. per sq.in. Mechanical or hydraulic core pulling mechanism is supplied. Dies can

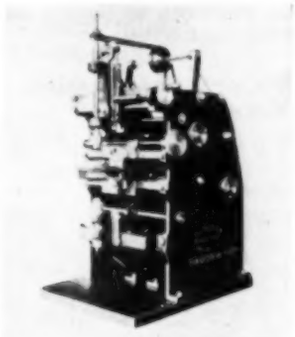


be shifted to compensate for variable expansion. A stop mechanism holds the dieholder at the open position so that inserts can be added. Model A machine: Capacity for dies, 9½ in. long x 6 in. high x 9 in. wide; die opening, 4½ in.; speed, 6 to 25 pieces pre min.; metal per shot, 10 cu.in. Model D: Capacity for dies, 18 in. long x 10 in. wide x 10 in. deep; die opening, 8 in.; speed, 2 to 7 pieces per min.; metal per shot, 35 cu.in.

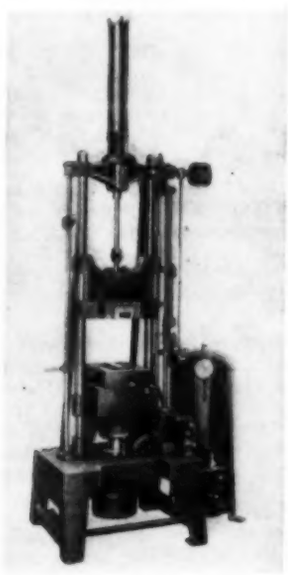
Die-Cutting and Polishing Machine, Wire-Drawing

H. J. Ruesch Machine Co., 401-411 Mulberry St., Newark, N. J. (Vol.77,p.355.) 178.

For cutting and polishing cemented-carbide, wire-drawing dies, the machine will make a finished die from an incased rough nib. The vertically reciprocating spindle, which can be swiveled to obtain a maxi-



mum included angle of 45 deg. in the die, holds the straight wire or tapered rod. A revolving split collet, which can be swiveled, holds the die while being cut. The approach angle, the reduction area, and the bearing are cut at one setting of the die in the chuck to assure concentricity of all diameters. The relief angle also is cut in the same setting. Width, 16 in.; depth 21 in.



Drop Hammer, Double-Action

Pneumatic Drop Hammer Co., 123 Heath St., Boston, Mass. (Vol.77,p.321.) 165.

A mobile head mounted in the supporting frame of the machine replaces the anvil common to an ordinary drop hammer. This mobile head is impelled upward and is so designed that its weight and rate of motion are such as to develop through a short distance of travel an amount of energy equal to that developed by the dropping head at the moment of impact. Thus, the two forces applied in opposite directions are spent in the work. The machine uses air at 80 lb. pressure.

Forming Machine, Cold-Roll, No. 00X

Kane & Roach, Inc., Syracuse, N. Y. (Vol.77,p.290.) 135.

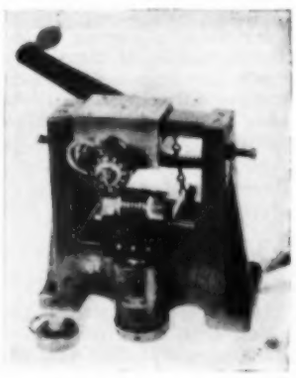
An outboard-housing type of cold-roll forming machine produces 270 ft. of formed strip per minute. Drive from the motor is by means of V-belts to a line shaft, to which is coupled a series of worm-reduction units, each of which drives a

number of roll stands. The machine is suitable for rolling a wide variety of shapes and sections and can be furnished with a varying number of roll stands and in various sizes.

Marking Machine, Hand, Bench-Type

Noble & Westbrook Mfg. Co., 20 Westbrook St., East Hartford, Conn. (Vol.77,p.223.) 107.

For marking serial numbers on locks and similar articles, the automatic numbering head

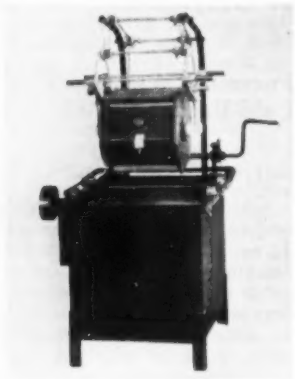


is placed below the article, to enable the operator to keep a close check on the series of numbers being marked. During the return stroke of the handle the wheels in the numbering head are automatically advanced to the next highest number.

Plating Barrel

Udylite Process Co., Detroit, Mich. (Vol.77,p.195.) 82.

A plating machine suited in size and design for plants that have frequent small rush jobs, The "Maximus Junior" has a tank of heavy welded-steel construction. Removable cylinder

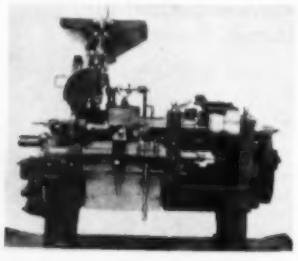


in which the small parts are placed is of perforated Formica. A hand hoist and drain board are provided. Tank size is 28 in. long, 21 in. wide, and 22 in. deep. Cylinder size is 12 in. diameter, 12 in. long.

Pointing and Threading Machine, Wood-Screw

H. P. Townsend Mfg. Co., P. O. Box 1206, Hartford, Conn. (Vol.77,p.578.) 271.

Single, double or triple threads can be cut by this improved wood screw pointing and threading machine. Drive is from an overhead jackshaft.

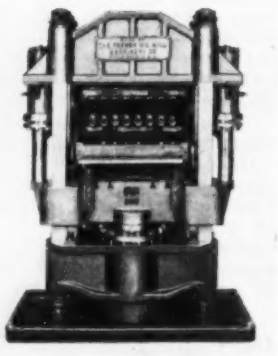


The spindle is of the two-jaw type. Jaw grips will hold two or three different sizes of heads by a simple adjustment at the rear end of the spindle.

Presses, Molding, Hydraulic

French Oil Mill Machinery Co., Piqua, O. (Vol.77,p.289.)

One press has an auxiliary tilting head to which the top die is attached. The advantage



of this construction is that the die members can always be inspected with ease, thus promoting cleanliness and the molding of accurate parts. A semi-automatic molding press is usually furnished with grids on which the molds are mounted. As this press returns to the open position, a lower knock-out is operated to eject the parts from the molds. The return motion of the platen also operates a top knock-out for ejecting parts from the top die.

Riveter, Compression, Yoke-Type

Hanna Engineering Works, 1765 Elston Ave., Chicago, Ill. (Vol.77,p.128.) 43.

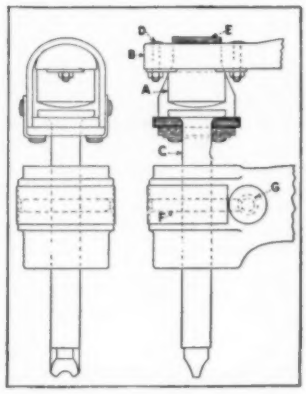
The riveter weighs 170 lb. and develops a pressure of 15 tons between the dies, sufficient for heading $\frac{7}{8}$-in. rivets cold. The yoke swivels 360 deg. about

the die axis and is quickly removable for interchanging it with yokes of other shape, reach and gap. Reach of the yoke illustrated is 3 in. and the gap is 3 in.

Riveting Hammers, Improvements

High Speed Hammer Co., Rochester, N. Y. (Vol.77,p. 737.) 35.

One of the improvements pertains to the design and assembly of the rubber cushion *A*, which in interposed between the front end of the hickory helve *B* and the reciprocating ram or hammer *C*. Friction and impact incident to striking the reciprocating ram are confined to the lower face of the rubber cushion. Binding action of the

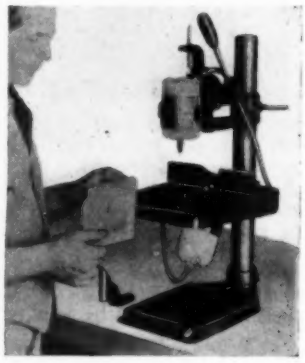


ram has been eliminated so that it can rotate freely. The rubber cushion at the rear of the helve is also improved.

Router and Shaper

Stanley Electric Tool Co., New Britain, Conn. (Vol.77,p. 800.) 415.

This moderately priced electric router and shaper is designed for wodworking and suitable for use in pattern shops. An interchangeable power unit makes possible the purchase of either a hand router, bench

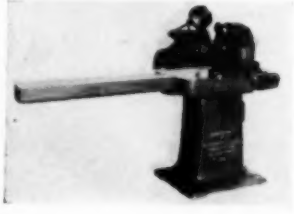


router or bench shaper. The unit operates at 18,000 r.p.m. The shaper table has an area of 10x14 in.

Saw, Cut-Off, Abrasive

Andrew C. Campbell, Inc., Bridgeport, Conn. (Vol.77,p.98.)

A rubber-bond abrasive wheel or disk $\frac{1}{8}$ in. thick does the cutting, revolving at 1,800 r.p.m. Wheel diameter, 16 in. Burning of the work is eliminated by immersing it in coolant. Downward movement of the cutting-off wheel is partially controlled by an adjustable counter-weight and the remainder by means of an oil dashpot. Maximum diameter of stock cut is 3 in.



Saw, Cut-Off, "Monoplex"

Red Star Products Corp., P. O. Station D, Cleveland, O. (Vol.77,p.674.) 327.

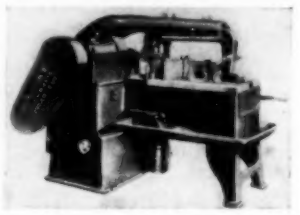
The machine is of massive construction. The precision-ground spindle revolves in pre-loaded SKF bearings and the rotating parts are dynamically balanced. Abrasive disk or a "Non-Flex Cutter" may be used. The "Non-Flex Cutter" is either 12 or 14 in. in diameter, with nine segments. The

cut is claimed to be almost polished. Any shape, solid or tubular, which falls within a $2\frac{1}{2}$ in. diameter circle may be cut on the standard machine. The saw is driven by a $7\frac{1}{2}$-hp., a.c., 60-cycle, $3\frac{1}{2}$-phase, 220-volt motor. A pole-changing switch permits two speeds; 4,700 r.p.m. for the Non-Flex cutter and 5,500 r.p.m. for abrasive disks.

Saw, Shear-Cut, Hydraulic

Racine Tool & Machine Co., Racine, Wis. (Vol.77,p.834.)

These machines are now manufactured in these sizes: 10x10 in., 12x12 in., and 10x16 in., besides special sizes of 13x13 in. and 13x16 in. Saw guide and frame now have ways on both

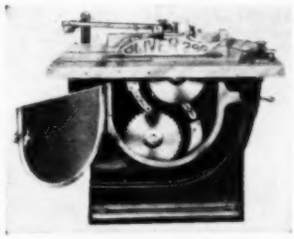


sides for better support. The connection between the saw guide and the hydraulic cylinder is accomplished by two tension rods so that cutting pressure is applied directly to the center of the blade.

Saw Bench, Double-Arbor

Oliver Machinery Co., Grand Rapids, Mich. (Vol.77,p.482.)

A motor-on-arbor-type tilting saw bench is for pattern shops where quick changeovers from ripping to cutting are desired. Shaftless motors are employed,

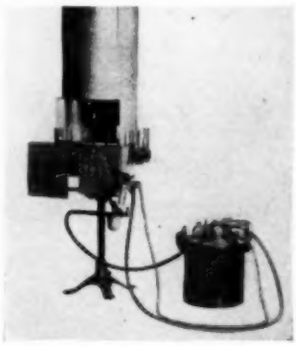


one on each of the two saw arbors. The yoke is held in a tilting frame. At any position between horizontal and maximum angle of 45 deg., either saw can be brought into action. The two arbors carry 12-in. rip and 12-in. crosscut saws.

Spray-Finishing Machines, Rotary

DeVilbiss Co., Toledo, O. (Vol.77,p.672.) 315.

Production of 1,000 to 3,600 small, light-weight articles per hour can be obtained from the Types YBA and YBB rotary



spray-finishing machines. An automatic loading and unloading mechanism may be supplied. Either manual or automatic spray gun operation can be had.

Swaging Machine, Rod

Langelier Mfg. Co., Providence, R. I. (Vol.77,p.195.) 70.

A swaging machine for pointing copper and nickel-silver rods preparatory to drawing to permit threading the stock through a die for gripping by the jaws. Three sets of dies furnished to reduce ¾ in., 11/16 in. and ⅝ in. stock about 0.150 in. per pass for a length of 12 in. Production averages 400 ends per hour. The machine has a pressure feed system for lubricating the operating parts in the head. The cover for the

dies is made for quick removal. A flywheel brake stops the spindle. Drive is from a 15-hp. motor through V-belts.

Swaging Machine, Wire

Langelier Mfg. Co., Providence, R. I. (Vol.77,p.194.) 71.

Wire is taken from the coil, straightened, swaged and cut to length. Wire to 0.065 in. can be used, and pins up to ¾ in. long can be swaged and cut off. The machine has a No. 1 swaging head. The frame has a slide

upon which the shearing, feeding and straightening heads are reciprocated by means of a double cam under the frame. The feeding and straightening heads are coupled together and act in unison. The shearing head is actuated by the feeding head, and its travel is controlled by adjustable stops.

Tapping Machine, Dial, Horizontal

Globe Tapping Machine Co., 751 Central Ave., Bridgeport, Conn. (Vol.77,p.608.) 299.

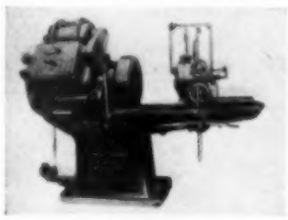
An automatic horizontal dial-type machine has been designed for light drilling, tapping, threading, screw inserting, burring and other operations the

operator only placing the parts into the dial ring. All other functions are automatic. Every operation is visible and easily adjusted.

Gearbox for Threading Machines

Landis Machine Co., Waynesboro, Pa. (Vol.77,p.225.) 93.

An eight-speed, selective-type gearbox for the 2-in. pipe threading and cutting machine, 2-in. pipe and nipple threading machine, and 2 and 2½-in. bolt threading machines. Heretofore,



these machines, when arranged for motor drive, employed a tumbler-type gearbox giving only five speeds. The new gearbox gives not only slower speeds, but also a number of faster speeds.

Welder, Spot, Air-Operated

Swift Electric Welder Co., Blvd. Temple Bldg., West Grand Blvd. at 12th St., Detroit, Mich. (Vol.77,p.288.) 131.

An air-operated automatic spot welding machine for production work on steel, stainless steel, aluminum, brass and copper. The transformer capacities are 25 to 40 kva., wound to operate on 220, 440 or 550 volts. a.c., single-phase. There

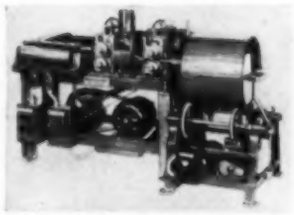
are six points of heat regulation for welding to a combined thickness of ¼ in. in steel.

A small main air cylinder operating through a toggle delivers pressure to the work.

Wire Cutting Machine

Sommer & Maca Glass Machinery Corp., 3600-3608 S. Oakley Ave., Chicago, Ill. (Vol. 77,p.513.) 227.

Production of welding wire is approximately 300 pieces, standard length, per minute, but a production of as high as 3,600



pieces per minute may be obtained on short lengths for other purposes. An arrangement can be provided whereby the wire receives a coating at the same time.

Wire Straightening and Cutting Machine, Automatic, No. 8-C

Lewis Machine Co., 1592-1600 E. 24th St., Cleveland, O. (Vol. 77,p.414.) 199.

Redesign has resulted in a machine that incloses all drive gears in oil housings, and uses feed and flywheel transmissions for production work and cutting of short lengths. A quick-action cam and lever to minimize marking or swelling of the wire.

The machine is available with

four or six roll straighteners ahead of the rotary straightener. The shutter is timed to open with the knife, thus preventing sagging of the cut piece, and assuring a square-cut end on each wire with minimum burr. The machine is suited for cutting lengths under 20 in., such as welding rods and special bolts. Capacity of the machine is ⅜-in. high-carbon steel or 7/16-in. mild steel down to 5/32 in. mild steel.

Wire Straightening and Cutting Machine, Automatic

F. B. Shuster Co., New Haven, Conn. (Vol.77,p.576.)

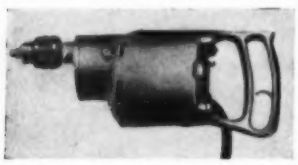
High-speed is possible in the cut-off because the cover which closes the guide bar is operated independently of the cut-off lever, and the guide bar itself is permanently fixed in the uprights. The straightening flier, the flywheel and also the high-speed driving shaft are mounted on ball bearings.

Portable Tools

Drill, Electric, ¼ In.

Signal Electric Mfg. Co., Menominee, Mich. (Vol.77, p.258.) 109.

Weighing only 6 lb., this drill has no-load speed of 1,700 r.p.m. The drill is 11¼ in. long, from the handle to the chuck, and the

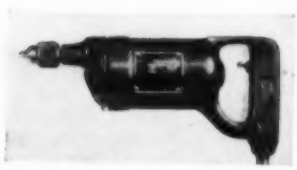


diameter is 4 in. Capacity of the three-jaw chuck is ¼ in. Body and handle are cast aluminum; gears are alloy steel, heat-treated.

Drill, Electric, ¼ In.

Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago, Ill. (Vol.77,p.513.) 240.

Weighing 5 lb. this "Thor" drill is equipped with ball bearings on both ends of the armature and with hand wound and

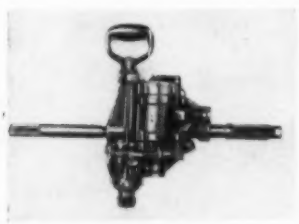


formed coils. The commutator is built on a brass sleeve that expands and contracts with the copper segments to prevent loosening. Speed, 2,200 r.p.m.; length, 11¼ in.; spindle offset, ⅜ in.

Drill, Boiler-Shop

Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago, Ill. (Vol.77,p.802.) 424.

This pneumatic boiler shop drill is equipped with power blades, has governor controlled air consumption and speed. Is adapted to both stay-bolt tap-

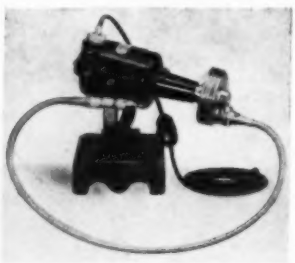


ping and flue rolling. Drilling and reaming capacity is up to 1¼ in.; speed, 210 r.p.m.; weight, 28 lb.

Filing Machine, High-Speed

A.K.C. Tool Co., Inc., 4219 Sullivan Ave., St. Bernard, Cincinnati, O. (Vol.77,p.673.) 332.

The "Record" high-speed form filing machine operates at 50,000 to 60,000 r.p.m. with no vibration. The motor is a



special ¼-hp. universal type, ball bearing equipped. The swivel handpiece is ball-bearing equipped and has a fixed tapered collet that takes a ⅛-in. shank.

Grinder, Hand, Air

Madison-Kipp Corp., Madison, Wis. (Vol.77.) 16.

An air grinder weighing only 7 oz. and running at 40,000 r.p.m. is known as the "Blue Midget." Developed for light

work and intermittent service. All air tool accessories and wheels having ⅛-in. diameter shanks can be used.

Grinder, Die, Portable

United American Bosch Corp., Springfield, Mass. (Vol.77, p.259.) 113.

For finishing metal patterns and dies, this high-speed electric die grinder is compact and has a spindle speed of 50,000 r.p.m. This speed permits the use of small wheels of 5/64 to ⅜ in. in diameter. It is said that the tool will grind very small radii. A pistol grip is furnished.

Grinder, Electric, Portable

Chicago Wheel & Mfg. Co., 1101 W. Monroe St., Chicago, Ill. (Vol.77,p.702.) 343.

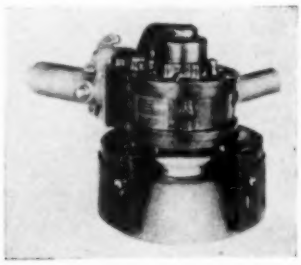
This tool is compact, well-balanced and light and suitable for use in pattern, die and welding shops. It weighs only 3

lb. A universal motor provides a maximum speed of 17,000 r.p.m. High-speed, dust-sealed ball bearings are employed.

Grinder and Disk Sander, Surface

Rotor Air Tool Co., 5701 Carnegie Ave., Cleveland, O. (Vol.77,p.289.) 134.

A portable tool in several models for various uses, each with a fixed speed best suited for the purpose. For grinding the 5,500 r.p.m. model employs a 6x1½ in. straight-side cup



wheel for flat surfaces. On welds a 6½x2 in. flaring cup wheel is employed. A 3,600 r.p.m. model is used with a cup-shape wire brush. For fine finish on metal surfaces the 4,700 r.p.m. model is equipped with a 9-in. flexible sanding pad or abrasive disk.

Grinder, Portable, High-Frequency, No. 61

Buckeye Portable Tool Co., Dayton, O. (Vol.77,p.797.) 354.

The No. 61 high-frequency electric grinder built in two speeds, 3,800 r.p.m. for use with 6-in. vitrified emery wheels, and 5,400 r.p.m. for use with 6-in. elastic-bonded emery wheels. The 3,800 r.p.m. tool can also be used with 8-in. elastic-bonded wheels. Features are the cool-running motor and the streamline ventilation system.

Hammer, Electric

Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago, Ill. (Vol.77,p.162.) 62.

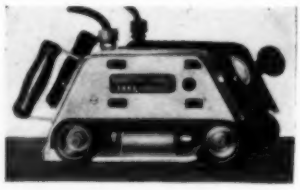
The "Thor" electric hammer and drill has following specifications: Blows per minute,

3,000; length over-all, 18 in.; weight, complete, 16 lb.; equipment furnished, ½-in. Jacob chuck.

Sander, Type T-3

Porter-Cable Machine Co., Syracuse, N. Y. (Vol.77,p.610.)

With a 3x24-in. belt but with no dust-collecting system, the Type T-3 sander can be used for polishing metal surfaces, either flat or curved. Good



balance, not only from right to left, but from front to rear, is accomplished by placing the ½-hp. motor in a horizontal position. Weight, 15 lb.

Screwdriver and Nut Setter, Portable

United American Bosch Corp., Springfield, Mass. (Vol. 77,p.258.) 112.

The outside diameter is only 2 in. and the weight is only 3¾ lb. The tool has an automatic pressure clutch, adjusted through

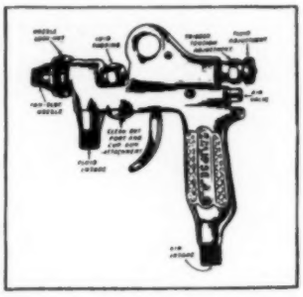
a scale for varying the driving force. A special stationary centering sleeve with self-centering bit prevents damage to screw heads.

Spray Gun, Type G-6

Eclipse Air Brush Co., 77 Orange St., Newark, N. J. (Vol.77,p.292.) 145.

Type G-6 spray gun has a variable trigger tension adjustment to be regulated to suit the operator. Regulation of the flow of the sprayed material is accomplished by a knurled-nut adjustment located at the "hammer position" on the gun. Width of spray may be varied.

Small Tools



Spray Gun, Type MB

DeVilbiss Co., Toledo, O. (Vol.77,p.386.) 188.

An air piston relieves the spring tension on the fluid needle when the air valve is opened. Thus, the trigger pull need only be strong enough to

open the air valve. A larger air passage allows a greater volume of air in the head and as a result permits better atomization and lower air pressure.

Electrical Distribution System for Portable Tools, "Trol-e-Duct"

Bull Dog Electric Products Co., 7610 Jos. Campau Ave., Detroit, Mich. (Vol.77,p.512.)

A duct and trolley system for conveying electric current to moving or portable electric devices, particularly such as used on continuous assembly lines. Consists of standardized, self-contained sectional units of steel duct, inclosing insulated busbars which distribute electric current through trolleys. Movement of carriage and trolley is facilitated by ball bearings.

Arbor, Full-Floating

Mid-State Mfg. Co., Waupun, Wis. (Vol.77,p.768.) 387.

This full-floating arbor with universal movement for use in connection with all vertical and horizontal reaming operations can be employed on automatic or hand screw machines, turret lathes, drill presses. It can be changed from a rigid arbor to

a full-floating arbor, or vice versa, while the machine is in motion. Standard arbors with suitable adapters will accommodate all kinds of standard shell reamers in sizes from 1½ to 6 in. Taper, straight or special shanks can be had.

Bending Tool, Hand

Sampson Tool Co., Inc., 101 Walker St., New York, N. Y. (Vol.77,p.414.) 194.

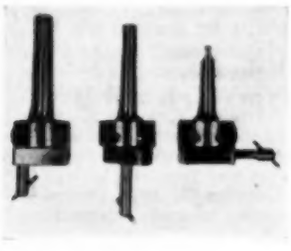
This tool will bend flats, rounds, squares, angles, T's, profile iron and also tubing down to 60 deg., hot or cold. When bending cold it will handle the following material:

flat bars, 2½x$\frac{5}{16}$ in.; rounds, $\frac{3}{4}$ in.; squares, $\frac{5}{8}$ in.; angles, 2$\frac{3}{4}$x$\frac{5}{16}$ in.; tees, 1½x$\frac{5}{16}$ in.; and tubing up to $\frac{3}{4}$ in. The tool is operated by a short hand lever and ratchet. Bending blocks are of hardened steel.

Boring Head, Off-Set

C. C. Craley Mfg. Co., P. O. Box 192, Shillington, Pa. (Vol. 77,p.448.) 213.

Off-set boring heads for use on milling, boring and drilling

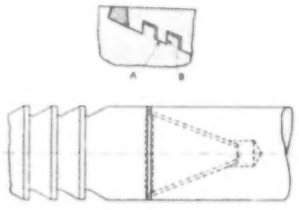


machines are available in five sizes. The dial has 50 divisions; the adjustment screw, 20 threads per in., movement of the dial one division sets the tool off center 0.001 in. Toolbits are held by standard socket-head screws. No. 1 and 2 heads are suitable for boring up to 4 in. in diameter.

Broach Shank, Detachable

American Broach & Machine Co., Ann Arbor, Mich. (Vol.77, p. 834.) 437.

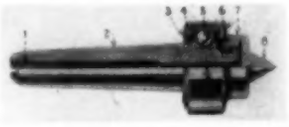
The detachable broach shank can be removed and placed on another broach when the first broach is worn out. Each detachable shank is good for use with one to two dozen broaches. The shank can be supplied to fit shanks $\frac{3}{4}$ in. in diameter and larger and with any type of pulling connection. The threaded portion is a steep taper causing the two surfaces at *A* to center themselves.



Center, Live, Heavy-Duty

Sturdimatic Tool Co., 5220 Third St., Detroit, Mich. (Vol. 77,p.675.) 334.

The contact member rotates on both radial and thrust ball bearings. Normally, all of the thrust load is absorbed by the thrust bearing at the rear. Abnormal overload is overcome

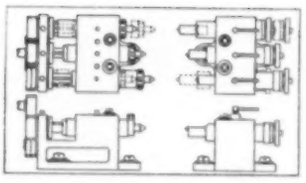


by a cushioning effect developed at (7). The outer race of the radial bearing is made a slide fit to prevent thrust load. The rotor nose is ground in its own bearings.

Centers, Spiral-Index, Adjustable-Angle

John B. Stevens, Inc., 304 Hudson St., New York, N. Y. (Vol.77,p.514.) 237.

Two-inch, three-spindle, adjustable-angle spiral index centers for universal milling machines are used with the regular dividing head and spiral



setting parts of the machine for the multiple milling of straight or spiral flutes, slots, ratchets and gears. All three spindles rotate in the same direction.

Centers, Index

Rex Machine & Tool Co., 9 Sheridan St., San Francisco, Calif. (Vol.77,p.580.) 281.

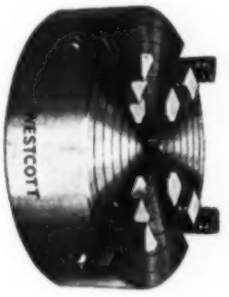
Plain and universal index centers are made for use at either the right or left hand end of milling machine tables. The spindle has a No. 9 taper hole and is threaded to receive a chuck or other fixture. Tongues and bolts to suit a $\frac{5}{8}$ in. T-slot

are furnished. The centers will swing 8 in. The index plates are provided with a double-edged rim 16 and 36 notches on one side, and 42 and 60 on the other. The spindle housing may be set from the 10 deg. below horizontal to 65 deg. beyond the perpendicular.

Chuck, Lathe, "I.X.L."

Westcott Chuck Co., 324 E. Walnut St., Oneida, N. Y. (Vol.77,p.832.) 434.

The light-duty I.X.L. independent lathe chuck is for use on light duty lathes of all kinds. The body of the chuck is made in one piece and of high-strength, close-grain nickel iron.

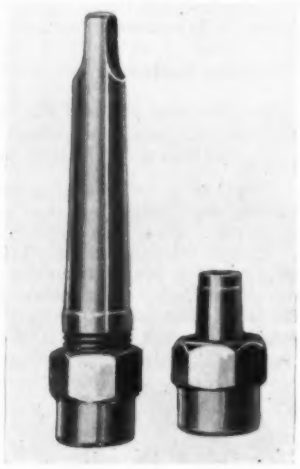


Case-hardened jaws have raised and ground steps. The long end of each jaw is serrated. Sizes of the chuck now available include 3, 4, 5, and 6 in., all with four reversible jaws. Jaw screws are threaded full length except where they are necked for the bearings and they have mortised heads to take a square-end T-handle wrench.

Chucks, Collet, "Palmgren"

Chicago Tool & Engineering Co., Inc., 8389 S. Chicago Ave., Chicago, Ill. (Vol.77,p.799.)

Collet chucks for holding straight shank drills, taps, reamers and end mills. Unscrewing the nut automatically releases the collet and drill. Collets are

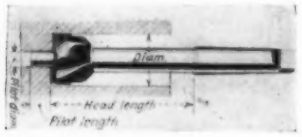


made with Morse taper shanks, with threaded or tapered bodies to fit machine spindles, also with B&S shanks for milling machines and straight round shanks for turret lathes.

Counterbore, Deep-Hole

O. K. Tool Co., Inc., Shelton, Conn., (Vol.77,p.131.) 46.

To bore deep holes, this two-bladed counterbore has two adjustable O.K. cutter blades inserted in a forged and heat-treated, alloy-steel body. The

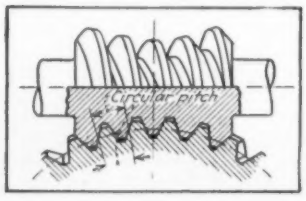


blades interlock with a pilot. Tools between 1½ and 6 in. in diameter are offered. Cutter blades are drop-forged high-speed steel, super-cobalt high-speed steel, J-Stellite, or cemented carbide.

Cutter and Hob, Worm Gearing

Michigan Tool Co., Detroit, Mich. (Vol.77,p.641.) 310.

In "Cone" worm gearing there is line contact, because when the worm flanks and wheel



teeth are cut by any plane passing through the worm axis they are both straight lines, tangent to a common circle, and hence contact simultaneously for the full depth of the thread and tooth.

The "Cone" worm provides a structure that follows the true curvature of the wheel and has a constant circular pitch corresponding with the constant circular pitch of the worm wheel. Hobs and cutters are made by the above, which will license others to make the gearing.

Cutter Adapters, End-Mill

Brown & Sharpe Mfg. Co., Providence, R. I. (Vol.77, p.611.) 287.

For use with spindles and adapters with cam lock and having a No. 30 milling machine standard taper hole, a line of cutter adapters is offered

for straight-shank end mills. The locking cam draws the cutter, arbor or adapter securely to a seat and furnishes a positive drive.

Cutter Adapter, End-Mill

Brown & Sharpe Mfg. Co., Providence, R. I. (Vol.77, p.641.) 317.

A cutter adapter made in two sizes, one to accommodate end mills with No. 5 B & S taper shank, and the other for end mills with No. 7 taper shank, are intended for use with the cutter adapters with cam lock (*AM*—Vol. 77, p. 611) to pro-

wide a means of changing end mills quickly without the necessity of removing the mill from the adapter illustrated. The end which fits into the adapter with the cam lock has a No. 30 milling-machine standard taper hole.

Cutting Alloy, "Rennite"

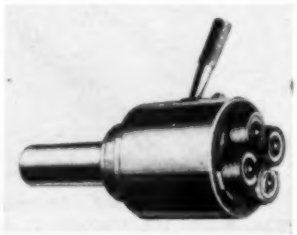
B. A. Field, 505-507 Orange St., Newark, N. J. (Vol.77, p.415.) 190.

The tungsten content of this alloy is understood to be exceptionally high. The alloy is fusion welded to special steel shanks in a variety of tool shapes. Tests of the material have given the following results: On 3 per cent nickel, casehardening steel, 35 tons tensile strength and 153 Brinnell hardness a rough turning speed of 170 ft. per min. was secured on bars and 128 ft. per min. on castings.

Diehead, Self-Opening, Non-Rotating

Murchey Machine & Tool Co., Detroit, Mich. (Vol.77, p.160.) 69.

The Type RG is designed to be used on hand screw machines or automatic machines where the diehead does not revolve. This tool takes the same chasers

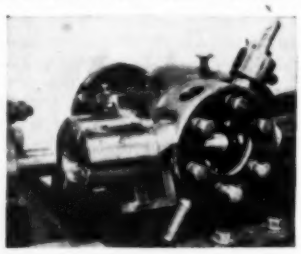


the Type RC rotating diehead. The RG is opened by a self-contained trip actuated by retarding the forward movement of the die spindle at any point. Size adjustment is built into the head. Sizes, ⅞ in. to 1¼ in. in diameter.

Diehead, Self-Opening, Screw Machine

Eastern Machine Screw Corp., Truman & Barclay Sts., New Haven, Conn. (Vol.77,p. 418) 198.

An "H&G" self-opening diehead for the No. 2 Brown & Sharpe automatic screw machine permits threading up to 1 in. in diameter by 2 in. long in both coarse and fine pitches. The clearance of the machine has heretofore been the limit-

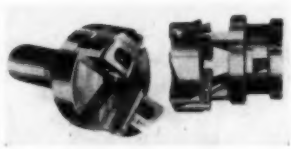


ing factor and has made it impossible to use a diehead of the size mentioned. Higher cutting speeds are possible and the chasers may be resharpened. It is not necesary to reverse the spindle for backing off.

Dieheads, Types V, L and H

Landis Machine Co., Waynesboro, Pa. (Vol.77,p.705) 356.

Hardened and ground dieheads offered comprise; ⅜- and ½-in. "Lanco" Type V



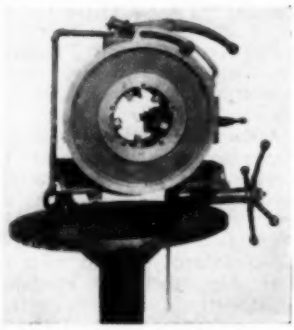
heads for hand-operated threading machines; ⅝-, ¾- and 1¼-in. "Landex" heads, Type L, for automatic screw machines; and ⅝-, ¾- and 1¼-in. "Landmatic" heads, Type H, for turret lathes.

The dieheads are offered for high-production or heavy-duty service, or for work that must be held to extremely close thread limits. They are made of special alloy steel. Chaser holders are mounted on the face of the head body, operate in dovetail slots and have a wide bearing surface. The shank or attaching flange is attached directly to the head body, and the drive is therefore direct. Position of the chaser holders is controlled by the prongs integral with the closing ring. The supporting surfaces for these prongs act as cams.

Diehead, Pipe-Machine, No. 706

Oster Mfg. Co. and the Williams Tool Corp., Cleveland, O. (Vol.77,p.323) 129.

No 706 diehead can be used to modernize old pipe machines. Capacities: threads from 1 to 6 in. and bolts from ¾ to 6 in. Micrometer adjustment for over or undersize threads is standard equipment. Threading dies are



of the small segmental type, mounted in holders. The head is equipped with a single high-speed cutting-off blade, screw-operated. Reaming and chamfering of pipe is done by means of a special forming tool.

Dresser-Holders, Emery-Wheel

Graham Mfg. Co., 71 Willard Ave., Providence, R. I. (Vol. 77,p.735) 362.

Two styles are built for use on common and special grinders. The long-base type has V-shaped projections to accommodate "Huntington" handles or to take ordinary round shanks. The square type is 4½ in. square. The long type is 2 in. wide by 9 in. long.

Drill Bushings

Centerlock Drill Bushing Co., 12125 Cardoni Ave., Detroit, Mich. (Vol.77,p.223) 84.

Standard interchangeable drill bushings are manufactured with a groove having a non-lock helix angle, which provides for a free-lock condition. Standard locating pins, rest buttons and

their retainers are manufactured with a groove having a locking helix angle that provides a fixed condition when assembled in place with a wrench.

Drive for End-Cutting Tools

Centerlock Drill Bushing Co., 12125 Cardoni Ave., Detroit, Mich. (Vol.77,p.579) 280.

This toolholder and method of drive for end-cutting tools minimizes breakage of the tools and holder and permits making multi-diameter tools in sections. A bushing is machined with a helical groove in which a round

wire helix is placed. The body is machined in a similar manner and drive is taken on the wire helix. The tool shank is of constant cross-section and therefore has no definitely weak part. The design eliminates impact loads on fastening or driving elements.

Feed Finger, Screw Machine

Sutton Tool Co., Curtis Bldg., 2842 W. Grand Blvd., Detroit, Mich. (Vol.77,p.353) 171.

Interchangeable and replaceable pads are used in the Style "L" feed finger for automatic screw machines. One master

and different sets of pads will handle practically the full range of one machine. Pads are also interchangeable in different makes of machines of the same machine size. Pads are seated in a recess in the master. The shoulder at either end of the recess holds the pads and takes the operating thrust. Pads can be furnished for handling round, hexagon or square stock.

Files, Needle

American Swiss File & Tool Co., 410-416 Trumbull St., Elizabeth, N. J. (Vol.77,p.257) 120.

Needle files have a knurled handle or tang in place of the old style smooth round handle or tang. The knurling prevents slippage and assures a firm grip without cramping the fingers of the user.

Grinding Wheel, Sectored

Blanchard Machine Co., 64 State St., Cambridge, Mass. (Vol.77,p.703) 342.

The "Sectored" wheel is in one piece, insuring uniformity. The inner wall carries the water down to the face and gives a continuity to the wheel face that

prevents pounding. The external notches are shaped to equalize the work done at different circumferences. Size, 18x5x14 in. for No. 16 surface grinder.

Hacksaw Blades, "Milford Resistor"

Henry G. Thompson & Son Co., New Haven, Conn. (Vol. 77,p.544) 257.

Hand frame and power machine hacksaw blades have been tested on cutting nickel, high-

speed steel, manganese steel, welded pipe and angle iron. Saws tested were 14x1x0.065 in. —10 T. per in.; material 4 in. square chrome-nickel, SAE 3140, speed 145 strokes per min. with coolant; time per cut, 10.5 min.; number of cuts per blade, 24. These data illustrate their speed.

Hammer, Rawhide-Face

Greene, Tweed & Co., 109 Duane St., New York, N. Y. (Vol.77,p.802) 425.

A "Basa" hammer with two adjustable rawhide faces. Each jaw is recessed to mushroom the rawhide at the back and

thus to prevent the face from falling out. When the faces become worn they can be replaced with refills.

Knurling Tool

Wade Tool Co., Waltham, Mass. (Vol.77,p.131) 50.

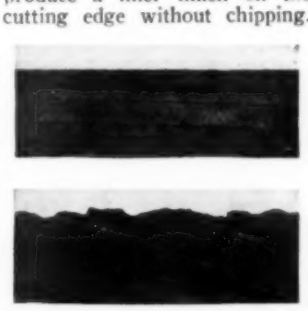
For knurling long or slender work, the tool illustrated supports the work by the two rear rolls. A coarse and a fine set

of diamond knurls is furnished. The tool is 7 in. long. Maximum capacity is $\frac{3}{4}$ in. in diameter; minimum, $\frac{3}{32}$ in.

Lapping Wheels, "Spedia"

Thomas Prosser & Son, 15 Gold St., New York, N. Y. (Vol.77,p.734) 369.

The above are now representing A. C. Wickman, Ltd., England, for "Spedia" lapping wheels and hand laps for "Widia" and other cemented-carbide cutting tools. These "Spedia" wheels are claimed to produce a finer finish on the cutting edge without chipping.

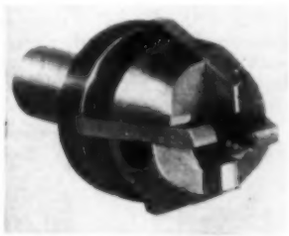


The illustrations show a comparison between the edge produced by an ordinary finish grinding wheel (bottom) and that obtained by a "Spedia" lapping wheel (top). "Spedia" wheels are stocked in cup form in the standard size, 3 in. in diameter by $\frac{7}{8}$ in. deep by $\frac{1}{2}$ in. hole by $\frac{3}{4}$ in. rim. "Spedia" hand laps can be used for finishing new tools.

Mill, Hollow, Adjustable

Genessee Mfg. Co., Inc., Rochester, N. Y. (Vol.77,p.480)

The Style "L" tool has blades set for brass and cast iron while the Style "M" has blades set at a 12-deg. cutting angle for work on steel. Both styles have the same adjustment, $\frac{1}{8}$ in. The blades are locked and supported



in heat-treated, chrome-nickel steel bodies. Each blade has a maximum of $\frac{3}{4}$ in. blade life. Fifteen sizes. The smallest has capacity from $\frac{1}{8}$ to $\frac{1}{4}$ in. and the largest from $1\frac{7}{8}$ to 2 in.

Polishing Sleeves, Turkish-Emery

Cleveland Container Co., 10639 Berea Rd., Cleveland, O. (Vol.77,p.609) 290.

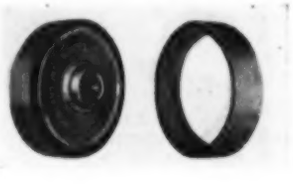
Endless abrasive polishing sleeves coated with Turkish emery make possible a high luster on aluminum, steel and other metals, whereas aluminum oxide

sleeves leave minute scratches because of the inherent hardness. The Turkish emery sleeves can be used dry or with grease, oil or emery cake.

Polishing Wheels, Expanding

Joseph L. Howland, 341 Frankfort Ave., N. W., Cleveland O. (Vol.77,p.766) 382.

"Jiffy" expanding abrasive and polishing wheels now range from 4 in. diameter by $1\frac{1}{2}$ in. face to 14 in. diameter by 4 in. face. The wheels consist of two inwardly sloping flanges and a heat-resisting reinforced rubber cushion band. The abrasive band is slipped over the rubber cushion, the flanges are placed in the rubber band



and mounted on the spindle. Tightening a spindle nut expands the rubber band to hold the abrasive band firmly.

Puller, Wheel and Gear, Universal

Armstrong Bray & Co., 308 Sheldon St., Chicago, Ill. (Vol. 77,p.672) 312.

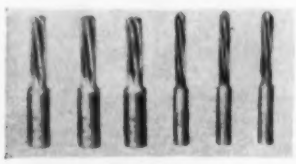
The "Steelgrip" universal gear and wheel puller, consists of a heavy bracket with large pulling screw and three chains. These chains are double

ended. Standard chain hooks at one end grip spoked wheels or large gears. Special hooks at the other end take a close grip on bushings, small gears and motor pulleys. Capacity, 12,000 to 36,000 lb.

Reamers, Stub, Screw-Machine

Pratt & Whitney Co. Hartford, Conn. (Vol.77,p.703.) 331.

For automatic screw machine work and for reaming jobs requiring short tools, these stub reamers provide decimal sizes



necessary for accurate production work. They are suitable for use in drill presses, hand screw machines, some styles of tapping machines and for reaming nut blanks. They are adapted for use in floating holders.

Screw-Plates, Round-Die

Greenfield Tap & Die Corp., Greenfield, Mass. (Vol.77,p.418)

"O.K. Jr." round die screw plates consist of twenty different sets of commonly used taps and dies in size ranges 4-36 to 12-24 machine screw and ¼ to ¾ in. The dies are adjustable and are held in the stock by three tapered screws. Each set is furnished in a hardwood box.

Solder Pot, Electric

Newton Junior Corp., 151 Court St., New Haven, Conn. (Vol.77,p.740) 360.

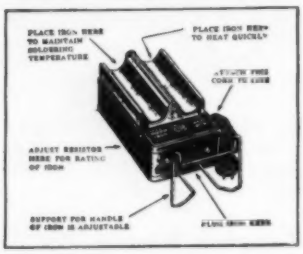
Closely maintained operating temperature, better heat distribution and full insulation are

features of the "Junior" electric solder and melting pot. This pot is suitable for tinning and dipping and for hardening small tools. Power consumption at maximum capacity is 275 watts. Pot capacity, is 4 lb.

Soldering Iron Stand

G-M Laboratories Inc., 1731-35 Belmont Ave., Chicago, Ill. (Vol.77,p.30) 7.

The stand has two cradles. When placed in the left-hand cradle the iron receives only sufficient voltage to keep it at



the minimum but proper soldering temperature for immediate use. When the iron is placed in the right-hand cradle, full line voltage is applied.

Soldering Outfit, "Torit," No. 23

St. Paul Welding & Mfg. Co., 209 W. Third St., St. Paul, Minn. (Vol.77,p.28) 5.

A small torch with four different tips, a soldering copper, rubber tubing and a connection for the small "Presto" acetylene tank constitutes the "Torit" Bo. 23 soldering outfit. The outfit is for soldering, tempering, light brazing, wire splicing and other small jobs requiring heat. It is not intended for welding.

Tantalum-Carbide Tools

Ramet Corp., North Chicago, Ill. (Vol.77,p.292) 142.

A complete line of Ramet tantalum-carbide tools for cutting, drawing and working all metals. Grade A: for general service in machining cast-iron and non-ferrous materials in which there is edge wear and only a slight tendency toward cratering. Grade AA: for intermittent cuts and other heavy-duty applications. Grade B: for cutting materials which require a combination of resistance to cratering and to edge wear, such as cast alloys. Grade C: for soft steels which have the greatest tendency to cause cratering. Grade D: for harder steels and high speed operation. Grade X: High resistance to both cratering and edge wear for very hard steel.

Tap, Collapsing, Class PS

Geometric Tool Co., New Haven, Conn. (Vol.77,p.290)

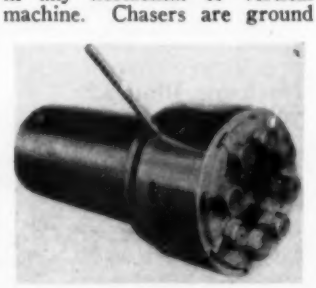
A sensitive-tripping tap has been developed for two purposes: (1) To handle a wide range of work on shallow depth tapping; that is, short thread lengths; and, (2) to handle

work where it is necessary to clear obstructions or projections at the bottom of the hole. The tap may be tripped either by a plate or by a lever. Three sizes cover the range from 1⅛ in. to 6 in.

Taps and Expanding Dies, Pipe

National Acme Co., Cleveland, O. (Vol.77,p.707) 358.

A complete line of circular chaser receding taps from 4 to 13⅛ in., and a series of expanding dies also employing circular chasers from 1 to13⅛ in. Tools are designed for use in any horizontal or vertical machine. Chasers are ground

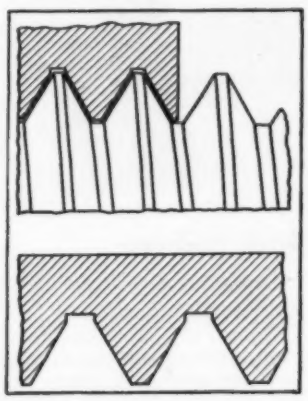


on the form, mounted on a block, being inclined in such a way that the successive chasers describe a helix on the pipe. By means of a serrated bushing, on which the chasers are mounted, they can be advanced for grinding.

Taps and Prong Dies, "Super-Crest"

J. M. Carpenter Tap & Die Co., Pawtucket, R. I. (Vol.77, p.769) 402.

The "Super-Crest" design provides full thread depth. The

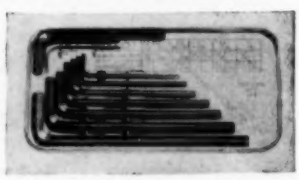


width of the flat at the crest is increased without changing the thread angle or other dimensions. The width of the flat is governed by the pitch but never exceeds 10 per cent of the thread depth. Modification of internal threads in this manner does not affect interchangeability with the American Standard thread form and achieves definite advantages. Among these are improved tool performance, increased tap life, better fit, and greater strength of the assembly. The Super-Crest tap can be produced to any degree of accuracy attainable in conventional taps.

Tool Boxes, "Hex-O-Wrench"

C. E. Little Mfg. Co., 28 Newberne St., Somerville, Mass. (Vol.77,p.223.) 96.

"Hex-O-Wrench" tool boxes have each wrench position stamped plainly in the box. One

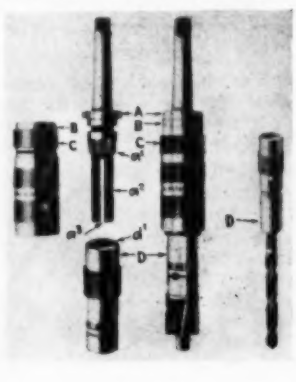


place is provided for each hex wrench. The tool box will take either short or long arm tools.

Toolholder, "Micro-Justable"

Eclipse Counterbore Co., Detroit, Mich. (Vol.77,p.195.)

Quick micrometer adjustment for length by hand in conjunc-

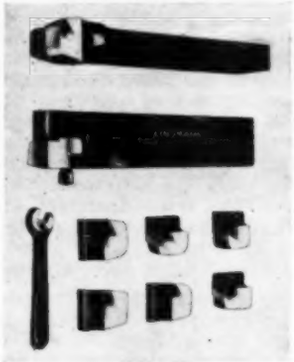


tion with a constant positive lock in any position are the principal features of the "Micro-Justable" toolholder. Any change in length from 0.001 to 1¼ in. is accomplished by raising the knurled lock sleeve *C* by hand and then turning the adjusting sleeve *B* and lowering the lock sleeve.

Toolholder for Dressing Car Wheels

Apex Tool & Cutter Co., Inc., Shelton, Conn. (Vol.77, p.643.) 311.

For turning and dressing car wheels, a pair of holders are illustrated with an assortment of toolbits. The standard holders are made to fit the toolpost of Sellers, Niles and Putnam wheel-turning lathes. The holders use either right- or left-hand toolbits. Two slots or stations are provided in each toolbit to allow for adjustment sideways.



Triangles, Shop, Cast-Iron

Van Keuren Co., 12 Copeland St., Watertown, Mass. (Vol.77,p.419.) 210.

Cast-iron shop triangles are provided with slots in each face for bolting them together, fastening to parts or clamping to the machine. All faces and angles are ground. In the sizes shown the 60 deg. triangle is approximately 3 in. in base width, 5 in. in height and 1½ in. in thickness, while the 45-deg. triangle is 3⅞ in. in base width, 3⅞ in. in height and 1½ in. in thickness.

Truing Tool, Diamond

Carboloy Co., Inc., 2481 E. Grand Blvd., Detroit, Mich. (Vol.77,p.481.) 225.

This Grade 300 tool has the best quality stones to accommodate the more difficult dressing jobs. The truing tool consists of a hard matrix throughout which a large quantity of diamond particles are distributed.

Wrench and Vise, "Velvo-Grip"

Wolverine Industries, Harbert, Mich. (Vol.77,p.802.) 339.

Each tool cushions its grip on materials by the use of wood jaws. Jaws are interchangeable in the vise and wrench and are made of standard 2x4-in. lumber. The vise consists of a two-part malleable iron frame, a set of cushion jaws and a screw yoke.

Vise, Pipe, Open-Side

Toledo Pipe Threading Machine Co., Toledo, O. (Vol.77, p.324.) 157.

The jaw construction permits working close to the face. The tool-steel jaws are easily replaceable. Three sizes: No. 00, capacity ⅛ in. to 1½ in.; No. 0, ⅛ to 2½ in.; and No. 3, ⅛ to 4½ in.

Gaging, Measuring and Testing Equipment

Gage Blocks, Rectangular

Van Keuren Co., 12 Copeland St., Watertown, Boston, Mass. (Vol.77,p.224.) 89.

The gages are of alloy steel, approximately ⅜ by 1¼ in., and ⅜ by 1⅜ in., and with mirror-like surfaces optically flat and parallel so as to combine readily by wringing together. They are held within a tolerance of 8 millionths of an inch. Two sets, containing 81 and 33 blocks are available.

Gage, "Electrolimit"

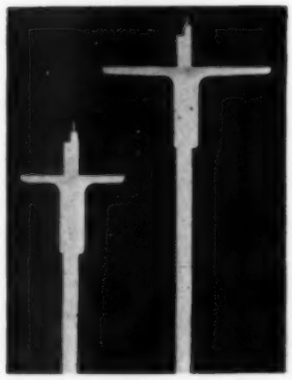
Pratt & Whitney Co., Hartford, Conn. (Vol.77,p.194.) 80.

An electric gage for checking a number of diameters simultaneously. Checking is done by means of electric contacts arranged to engage desired surfaces. When the part is within the desired limits, no lights appear on the indicating board. If any dimension is oversize, the corresponding green light flashes on. If it is undersize, the red light appears.

Gages, Depth, Mauser

Geo. Scherr Co., 128 Lafayette St., New York, N. Y. (Vol.77, p.31.) 2.

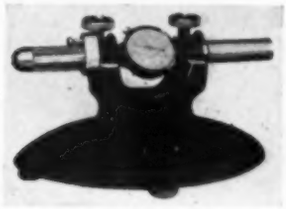
These two gages have a 6½-in. and a 3½-in. scale respectively. Both are fitted with a vernier reading to 0.001 in. The sliding scale is fitted to the body of the tool so that a fine feel is secured for the measurement.



Gage, Plug, Dial

Standard Gage Co., Poughkeepsie, N. Y. (Vol.77,p.163.)

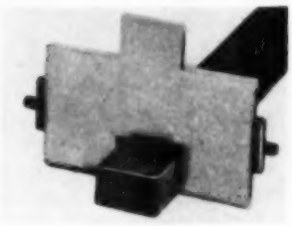
For measuring bore diameters, this portable dial gage can be used either at the machine or as a bench comparator. The mechanism is automatically self-aligning and indicates the diameter on its true center line. It is possible to measure the full length of the bore, determining tapered, bellmouth or out-of-round conditions, as well as go or not go limits. Sizes are made from ½ in. diameter up. The indicating unit can be furnished with a dial indicator, graduated in 0.0001 in., 0.0005 in., 0.001 in. or in metric graduations.



Gage, Profile

Wonham, Inc., 44 Whitehall St., New York, N. Y. (Vol.77, p.608.) 264.

The gage is made of metal laminations that adapt themselves to any shape. After the desired profile is obtained, it may be held by tightening the tension nut. The instrument may be placed flat on a drawing board or the work for the purpose of marking cutouts.



Gage, Thickness, Dial-Type

B. C. Ames Co., Waltham, Mass. (Vol.77,p.94.) 29

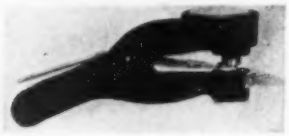
The dial is graduated in thousandths. A chart stamped

on the back shows the nearest fractional equivalent to the reading. Made of non-rusting metal and with an unbreakable crystal, the device fits in the vest pocket.

Gage, Thickness, Model 644

Federal Products Corp., 1144 Eddy St., Providence, R. I. (Vol.77,p.546.) 249.

Model 644 thickness gage solidly clamps the material before the measuring anvils come in contact with the work to

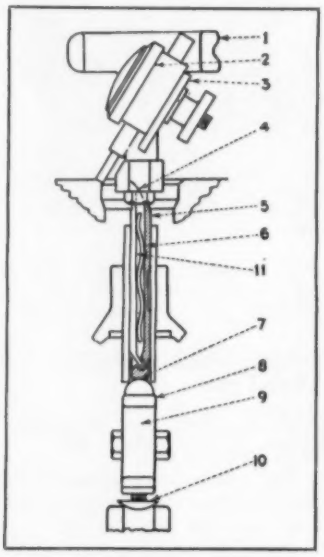


eliminate the effect of human touch. In the center of the lower surface is a stationary gaging point. In the upper surface is a gaging point making direct contact with the dial indicator.

Gage, Valve-Seat, "Concentrometer"

P. M. Schlauch Tool Engineering Co., 4040 W. Philadelphia Ave., Detroit, Mich. (Vol.77,p.227.) 91.

The tool shows whether the angular seat of a gas-engine valve is concentric with the axis of the valve guide. The tool is adaptable to both intake- and exhaust valve seats. When



in position the indicator assembly is revolved around the valve seat and the indicator needle observed.

Comparators, Mirror, "Microlux"

Marburg Bros., Inc., 90 West St., New York, N. Y. (Vol.77, p. 515.) 254.

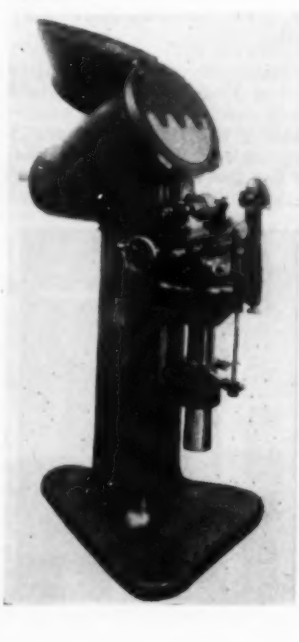
The "Microlux" mirror comparator can be adapted to different purposes by modifying the measuring anvil. The test is indicated by a line showing against a circular illuminated background on the frosted glass screen. Four indicators are provided and may be set for minimum and maximum dimensions. Two of the indicators may be set for closer limits and two for wider limits. Two standard comparators are built besides a thread comparator.

Comparator and Measuring Machine

Jones & Lamson Machine Co., Springfield, Vt. (Vol.77, p.771.) 385.

The machine can be supplied with or without measuring attachments for making vertical, lateral and angular measurements. Maximum vertical table travel is 6 in. The hood incases the mirror and supports the screen and projection lens.

Three styles of tables are: a plain table without lateral adjustment, a table with 4 in. lateral adjustment and a table with 10 in. lateral adjustment. All three can be swiveled 15 deg. either side of center. A vertical measuring attachment has a range of 2 in. For measuring angles a vernier attachment is supplied.



Projector, Profile

R. Y. Ferner Co., Investment Bldg., Washington, D. C. (Vol. 77,p.797.) 394.

Built by the Societe Genevoise d'Instruments de Physique. Geneva, Switzerland, this profile projector projects from below onto a heavy glass screen set in the top of a steel cabinet. A plain center support and an inclinable center support, each 5 in. between centers and 2⅞ in. swing, are furnished. The latter permits mounting and

setting screws, taps or milling centers inclined at their helical angle to give a horizontal cross-section of the profile of the thread. Measurements can be made to 0.01 in. or 0.005 in., which are equivalent to 0.0001 in., or 0.00005 in. on the object when using the objective giving a magnification of 100 times. Four objectives give magnifications of 10 to 100 times. Articles as large as 1¼x1⅞ in. may be projected with the 10-power objective.

Gear Testing Equipment, Optical

R. Y. Ferner Co., Investment Bldg., Washington, D. C. (Vol. 77,p.483.) 212.

Designed for rapid, routine work, an optical gear testing machine for measuring both the pitch and eccentricity of small gears is built by the Societe Genevoise d'Instrument de Physique, Switzerland. This equipment does not project an image of the teeth, but throws on a graduated screen a rectangular shadow of a signal plate, by which on the horizontal ordinate of the screen one reads the variations of eccentricity and on the vertical ordinate the errors of pitch.

Capacity is for gears up to a maximum of 4 in. in diameter and a maximum of 0.16 in. Feelers, or the contact anvils, are regularly provided for modules of 0.5 to 2.0 mm. or for diametral pitches of 50 to 12 approximately. Direct readings of divisions of the scales can be made to 0.0002 in. The gear tester is suitable for gears used in fine machinery and clockwork.

Measuring Machine, Universal, Model MU-100

R. Y. Ferner Co., Investment Bldg., Washington, D. C. (Vol. 77,p.95.) 17.

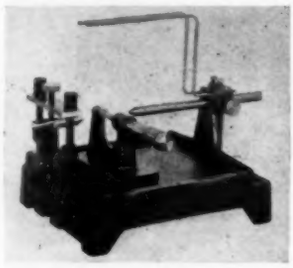
Developed by the Societe Genevoise d'Instruments de Physique, Geneva, Switzerland. The capacity of the machine is 100 mm., or 4 in. It can be supplied graduated in either inches or millimeters and reads to an accuracy of 0.00005 in. or 0.001 mm. Its field of use covers the checking of plug gages both as to diameter and cylindricity, the measurement of pitch and three diameters of thread gages, the testing of the gap of snap gages, the determination of pitch, diameters and

also of the relief of taps, and the calibration of various other calipers, micrometers and pieces with either spherical ends or parallel faces. The machine refers the work directly to a line standard. Bed of the machine has fixed contact anvils at each end, the left one for snap gages. A slide between the two anvils carries the movable anvils and the glass scale. Displacements of the slide are read directly by the measuring microscope. External and internal measurements can be made.

Measuring Fixture, Thread, Three-Wire

Brown & Sharpe Mfg. Co., Providence, R. I. (Vol.77, p.227.) 92.

The No. 200 fixture checks short and long taps with even numbers of flutes, and external thread gages where the highest degree of accuracy is not demanded. Range of measurement is 2 in. Threaded parts are held between the pointed shaft and the V-slide. A feature is the floating of the micrometers on steel balls, thus permitting the anvil to be "squared" with the measuring wires. Micrometers are graduated to one-half thousandths.



Measuring Instrument, Flatness

Van Keuren Co., Watertown, Mass. (Vol.77,p.354.) 174.

A flatness measuring instrument, claimed to give the same precision in measuring machined, ground, scraped or dull-lapped surfaces as that obtained with an optical flat on highly finished steel surfaces, consists of a channel which supports a cylindrical line contact at one

end, a micrometer at the other end, and a sensitive light wave indicator in the center. Means are provided for changing the positions of all three measuring contacts to permit measuring different surfaces, such as ring shaped laps, surface plates, and machine ways.

Rule, Tape, Stainless

Lufkin Rule Co., Saginaw, Mich. (Vol.77,p.195.) 60.

"All-Steel Crescent" No. S-696 has a stainless steel blade, sliding hook, and case. The 6-ft. rule is offered in marked inches to 16ths. The steel rule can be projected unsupported and will flex around objects.

Rule, Tape, "Aristocrat"

Lufkin Rule Co., Saginaw, Mich. (Vol.77,p.513.) 226.

An embossed design with a background in black enamel is used for the stainless steel case of the "Aristocrat" 6-ft. tape rule. The case is 1⅛ in. in diameter. The steel rule can be projected unsupported and will flex around objects.

Rules, Steel, Flexible-Rigid

Stanley Rule & Level Plant, Stanley Works, New Britain, Conn. (Vol.77,p.803.) 347.

Three "Pull-Push" rules of flexible-rigid construction. The blade can be removed entirely from the case and used for end-to-end measurements. Other features are: nickel plated blades; safe "Pull-Push" blade action; graduations lie close to the work; watch size cases, 2 in. in diameter.

Rule, Steel

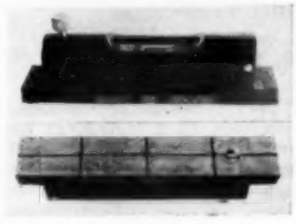
Brown & Sharpe Mfg. Co., Providence, R. I. (Vol.77, p.545.) 256.

The No. 315 tempered steel rule is graduated in 10ths and 50ths on one side, and 32nds and 64ths on the other. A rule case is made of dull-finish aluminum and has rounded corners. It is suitable for 6 in rules up to 0.045 in. thick and up to ¾ in. wide.

Level, High-Precision

R. Y. Ferner Co., Investment Bldg., Washington, D. C. (Vol. 77,p.416.) 197.

A high-precision level, reading to 5 seconds of arc per division is adapted for shop use in checking machine tools and high-speed transmissions, setting sine bars on inclined surfaces,



leveling baseplates and beds of machinery, and for manufacturing tools and fixtures. Length of the base is 6½ in. and the width is 1⅞ in. The level vial is adjustable by means of a knurled screw. Total capacity is 40 seconds of arc.

Level, Pendulum

Pacific Sales & Equipment Co., Ltd., 1438 Beachwood Drive, Los Angeles, Cal. (Vol. 77,p.707.) 346.

On one side of the face the graduations are in degrees and on the reverse side in inches of slope per foot. The level can

be used in machine shops to provide an accurate cross head for a lathe, saving time, and also can be used in the construction and testing of airplanes where nearly all wings and struts are on an angle.

Level, Square, Supersensitive

George Scherr Co., 128 Lafayette St., New York, N. Y. (Vol.77,p.766.) 368.

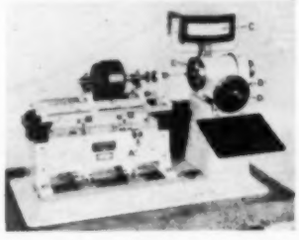
The Stieselmeir supersensitive level has a rigid square frame, one side of which is plane while the other three sides are prismatic. The level can be used for the aligning of horizontal and vertical surfaces as well as shafts. Accuracy of 0.0005 in. per ft. for the longitudinal level is guaranteed. A secondary

cross level allows the device to be held in the horizontal position when using it on shafts and V-ways.

Balancing Machine, Static-Dynamic, Style E-O

Tinius Olsen Testing Machine Co., 500 N. 12th St., Philadelphia, Pa. (Vol.77,p. 543.) 320.

For balancing the smallest rotors, this machine indicates to 0.0001 oz.-in. Angle of unbalance is indicated to plus or minus 1 deg. The part is mounted in a cradle held in place by spring-mounted retaining rollers, the vibrations of which (caused by unbalance in



the rotor) generate electric current proportional to the unbalance. Phase relation of this current to the rotation of the body indicates the angle of unbalance. The alternating current is rectified through a commutator device from which the angle of unbalance is obtained, and from the electric meter the exact amount of unbalance is determined.

Balancing Machine, Static, Style L

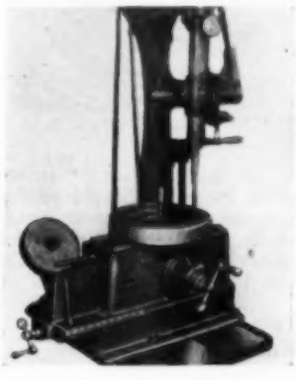
Tinius Olsen Testing Machine Co., 500 N. 12th St., Philadelphia, Pa. (Vol.77,p. 739.) 321.

Flywheels, clutch parts and assemblies can be statically balanced on the Style L automatic-weighing, static-balancing machine. The part is mounted on an adapter fitted to the spindle. The dial indicator may be set so that the markings will indicate either the amount of unbalance in the range desired in ounce-inches to be removed or added. Parts weighing from 2 to 15 lb. are taken by the smallest size and parts weighing from 2,500 to 20,000 lb. by the largest size. The mechanism is mounted on a sturdy base.

Balancing Machine, Static

Taylor Mfg. Corp., 2330 W. Clybourn St., Milwaukee, Wis. (Vol.77,p.795.) 393.

"Hi-Eff" static balancing machines enable the balancing of various-shaped or sized parts in quick succession without a change in set-up. Unbalance can be corrected to 0.01 in.-oz. on the smaller models, to 0.1 in.-oz. on the largest. Standard models are built to handle parts

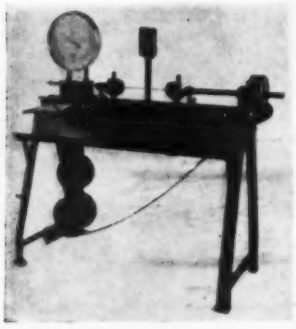


as light as one ounce and as small as 1 in. outside diameter whereas larger sizes will handle parts up to 48 in. in diameter and weighing up to 600 lb. Location of the heavy spot is obtained through the use of a spirit level. Weighing of the unbalance is accomplished either by a hand-operated weighing beam or through an automatic weighing dial. Calculating the number of holes to be drilled and their depth can be done on the automatic calculator attachment.

Testing Machine, Tensile-Strength, Type 275

Amthor Testing Instrument Co., Brooklyn, N. Y. (Vol.77, p.673.) 309.

Cable and sheet materials are tested on Type 275 power-driven machine of the horizontal type. Machine operates on the pendulum principle. When the specimen breaks, the tensile strength in pounds is shown on

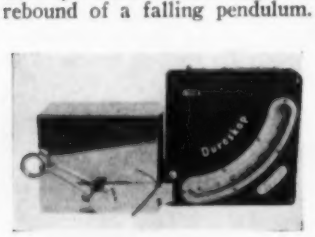


the dial. The motor and the pulling clamp stop automatically and the pendulum returns to the vertical position.

Testing Instrument, Hardness, Wire

R. Y. Ferner Co., Investment Bldg., Washington, D. C. (Vol.77,p.194.) 81.

This special "Duroskop" tests the hardness of wire and other cylindrical material of small size by means of the angle of rebound of a falling pendulum.



A cylindrical anvil strikes across the wire. Rapid routine tests are possible on wires as small as 0.004 in. or for cylindrical objects as large as 2 in. in diameter.

Tester, Stiffness, Model E

Smith-Taber, North Tonawanda, N. Y. (Vol.77,p.794.)

Filaments from the finest size up to 0.050 in. in diameter and sheet from the thinnest foil to materials 0.010 in. thick may be tested. The stiffness usually becomes stabilized within 3 to 30 min. The test strip is

placed in the clamp at the upper end between V guides. The indicator arm is moved steadily across the scale and the reading is taken at the point indicated by the pilot light. The operation is repeated over the opposite scale. The totalized result represents the stiffness of the specimen.

Strain Gage, Olsen-DeShazer

Tinius Olsen Testing Machine Co., 500 N. 12th St., Philadelphia, Pa. (Vol.77,p.31.) 15.

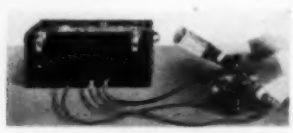
Relative motion of the gage points is always parallel. Parallel motion of the points is transmitted through the levers and a plate fulcrum system to

the dial indicator. The gage points, having a 30-deg. angle, are used in drilled holes. The illustration shows instruments of both the 10-in. and 2-in. gage lengths.

Stroboscope, "Edgerton"

General Radio Co., Cambridge A, Mass. (Vol.77, p.196.) 78.

The stroboscope permits viewing moving objects as though stationary or as though moving at relatively low speeds, so that their behavior may be studied

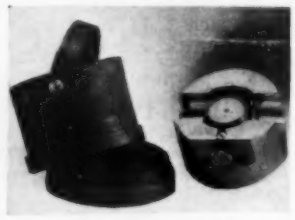


or photographed. The device consists of a mercury-vapor lamp capable of giving light flashes of short duration, high frequency and brilliant intensity. Flash speed of the lamp can be controlled from a.c. lines by an oscillator or by a synchronous motor contactor.

Vibrometer, Portable

Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa. (Vol.77, p.129.) 53.

The instrument consists of a flexibility supported mass and a dial indicator fastened to the end of a thumb screw and supported by the mass to measure



the amplitude. The vibrometer has been used for frequencies as high as 6,000 per min. when the amplitude does not exceed 0.004 in.

Vibrometer

L. S. Starrett Co., Athol, Mass. (Vol.77,p.547.) 265.

The "Vibrometer" measures amplitude of vibration in machinery and is useful for checking the balance of units revolving at high speeds. It is designed for ease and convenience of use.

Electrical Equipment

Motor, Arbor

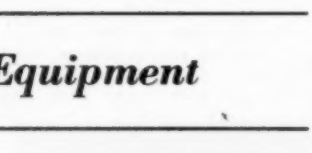
Louis Allis Co., Milwaukee, Wis. (Vol.77,p.801.) 414.

A line of inclosed, self-ventilating arbor motors ranges in size from 2 to 10 hp. These motors are adaptable to applications where the available space for mounting is limited.

Motor, Small-Diameter

Louis Allis Co., Milwaukee, Wis. (Vol.77,p.356.) 127.

For such uses as direct-mounted grinding wheels, saws, and cutterheads, where the

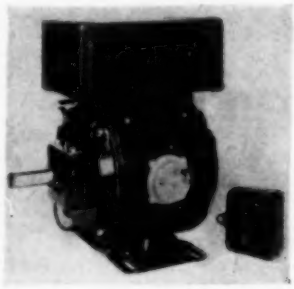


diameter must be held to a minimum, this motor can be had in ratings from 30 to 100 hp. The top of the motor is flat, and the distance between this flat surface and the center of the shaft is 5 7/8 in. on all ratings. The diameter is 12 or 14 in.

Motor, Capacitor, Self-Protecting

Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa. (Vol. 77,p.221.) 105.

Equipped with a small disk-type thermostat, a line of resilient - mounted, single - phase

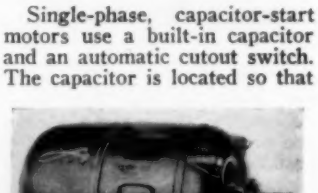


capacitor motors, which protect themselves from burning out regardless of service conditions, has been placed on the market. The thermostat opens the supply current when the motor temperature approaches a dangerous value, and automatically re-starts the motor as soon as it cools down.

Motor, Capacitor, Self-Contained

Louis Allis Co., Milwaukee, Wis. (Vol.77,p.796.) 389.

Single-phase, capacitor-start motors use a built-in capacitor and an automatic cutout switch. The capacitor is located so that



a stream of cooling air passes over it constantly. Sizes available range from ½ to 3 hp.

Motors, Capacitor, Single-Phase

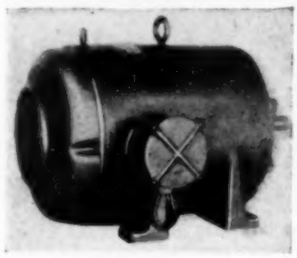
Marble - Card Electric Co., Gladstone, Mich. (Vol.77,p.832.)

This line of single-phase capacitor motors is similar in construction to a two-phase squirrel cage motor with a condenser connected across one phase for starting, the condenser being cut out automatically by a contactor when the motor comes up to speed. The condenser and contactor are mounted in a sheet-metal starting unit, shown.

Motor, Inclosed, Fan-Cooled

Ideal Electric & Mfg. Co., Mansfield, O. (Vol.77,p.578.)

This motor of dust-type construction and of the same size as an ordinary open-type motor of the same rating has two shells. Motors are made in all sizes from 1 to 200 hp. as squirrel-cage induction motors



with 1, 2, 3 or 4 speeds. They are also available as across-the-line-start motors up to 200 hp. and can be supplied for power-factor correction as 100 per cent or 80 per cent leading-power-factor induction motors.

Motor, Inclosed, Explosion-Proof

U. S. Electrical Mfg. Co., Los Angeles, Calif. (Vol. 77, p.323.) 156.

Two inclosing frames, with a large fan mounted between the frames, are employed for this explosion-proof motor. Wind-

ings are insulated with asbestos and impregnated with "Asbestosite." Rotor is of die-cast aluminum and the inner shell is of cast steel.

Motor, Splash-Proof

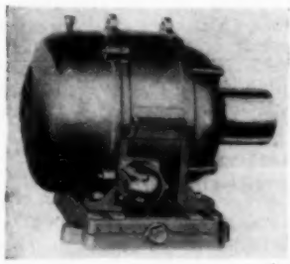
Century Electric Co., St. Louis, Mo. (Vol.77,p.354.) 173.

Splash-proof motors from 1 to 30 hp. have one-way ventilation by intake and outlet openings in the lower section of the end brackets. The bearing bracket is fitted to the frame by a long-contact sealed fit. Cartridge-type, grease-lubricated ball bearings are used.

Motors, Fan Seal

Marble-Card Electric Co., Gladstone, Mich. (Vol.77,p.99.)

Fan seal motors in sizes ranging from 2 hp. at 900 r.p.m. to 30 hp. at 1,800 r.p.m., are self-cooling, self-cleaning, self-protecting, entirely inclosed. and do not require a special motor housing or ventilating system.



Motors, 3-Hp.

Emerson Electric Mfg. Co., St. Louis, Mo. (Vol.77,p.292.)

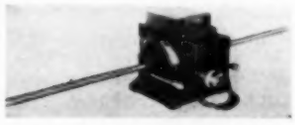
Three-horsepower motors, 1,725 r.p.m., can be furnished in single-phase, repulsion-start induction and polyphase squirrel-cage types besides a d.c. com-

pound-wound type. Shafts are of tool steel and bearings are of bronze. Motor frames have ventilating openings, and a fan is mounted on the armature shaft.

Motor, Long-Shafted, Fractional-Hp.

Holtzer-Cabot Electric Co., Boston, Mass. (Vol.77,p.770.)

The motor will operate multiple-fan units in air-conditioning apparatus. It is a quiet-operating, adjustable, variable-speed,



single-phase a.c. capacitor type with resilient mounting. The motor has wool-packed bearings and the control apparatus is self-contained.

Motors, Split-Phase

Century Electric Co., St. Louis, Mo. (Vol.77,p.98.) 55.

Split-phase motors in sizes from 1/60 to ½ hp. have frames of rolled steel construction. Bearings are phosphor bronze with wool-yarn lubrication system. End brackets protect against dust and water.

Motors, Universal

Dumore Co., Racine, Wis. (Vol.77,p.223.) 95.

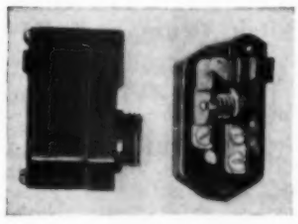
Type K-3 is a series universal motor designed for applications where better than average performance is required. Ratings are as follows: 30 min. rating at 5,500 r.p.m.—⅛ hp.;

continuous duty at 6,500 r.p.m. —⅛ hp. The J-3 is the same as K-3 except in design of mounting and ventilation. The Type EEXQ motor is a small, slow-speed motor with a single worm-gear reduction. Shaft speeds are 200 to 750 r.p.m.

Breaker, Overload, Fractional-Hp.

Square D Co., Industrial Controller Division, Milwaukee, Wis. (Vol.77,p.222.) 83.

For the overload protection of fractional-horsepower, single-phase motors, "Knockout" Class 9020, Type W10 breaker is designed to mount on and wire into a standard ½-in. knockout. Over-all dimensions of the



bakelite case are 2 7/16 in. high, 1⅛ in. wide and 1¼ in. deep. After an overload the breaker is reset from an indicating button. Maximum rating is ¾ hp., 110 or 220 volts, a.c.

Circuit Breakers, Small

General Electric Co., Schenectady, N. Y. (Vol.77,p.351.) 153.

A line of small circuit breakers, rated up to 600 volts and 600 amperes, offers speedy restoration of service, taper-proof protection and quiet operation.

Interruption of the arc takes place within a closed metal chamber. The breakers are trip-free. A target indicates that the breaker has tripped. Provision is made for convenient mounting in panel boards or individual metal inclosures.

Contactor, Adjustable-Timing, Type 1290

Automatic Temperature Control Co., 34 E. Logan St., Philadelphia, Pa. (Vol.77,p.800.) 409.

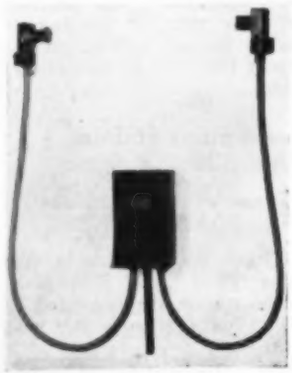
Power is obtained from a reversing synchronous motor and the contact arm moves alternately clockwise and counter-clockwise within the time limit set, making a 10 amp., 110 volt,

a.c. load circuit for an adjustable time at either extreme of its travel. Contactors are also available to be actuated from a momentary contact switch to run for the time cycle for which they have been adjusted and stop until the starting switch is again energized.

Controller, Photoelectric

Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa. (Vol. 77,p.130.) 51.

The "Photo-Troller" device can be actuated by a phototube or by delicate contacts to operate a grid glow tube, which

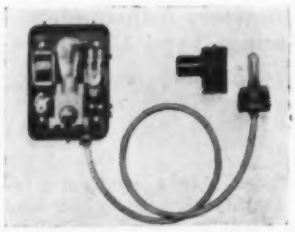


in turn closes a contactor capable of initiating any desired operation. Delicate intermediate relays are eliminated and greater reliability is secured.

Relay, Photoelectric, General-Purpose

General Electric Co., Schenectady, N. Y. (Vol.77,p.417.)

In the Type CR7505-A4 improved general-purpose photoelectric relay, a single-pole, double-throw snap switch now eliminates any wiring changes. With the switch in one position, the relay will function when light is admitted, and when the



switch is thrown to the other position, the relay will only operate when the light source has been cut off.

Relay, Photoelectric

J. Thos. Rhamstine, 508 E. Woodbridge St., Detroit, Mich. (Vol.77,p.832.) 344.

An inexpensive "Electric Eye," or photoelectric relay equipment, employs a dry-disk photocell, a small battery and inexpensive relay with acces-

sible adjustment. It provides the basic unit for simple set-ups to control articles on assembly lines and to control machines.

Pushbutton Station, Type B20

Square D Co., Milwaukee, Wis. (Vol.77,p.611.) 301.

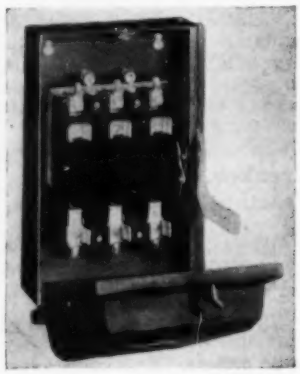
Large pushbuttons in the Class 9001, Type B20 push-button station are supported by strong compression springs with

an additional follow-up spring at the contacts. Mounting dimensions are 2½ in. wide by 4¼ in. high by 2⅞ in. deep.

Switches, Compact

Square D Co., Detroit, Mich. (Vol.77,p.707.) 308.

In this 50,000 Line an unusual arrangement of the base permits the entire area of the back of the box to be used for wiring. A front operating handle is

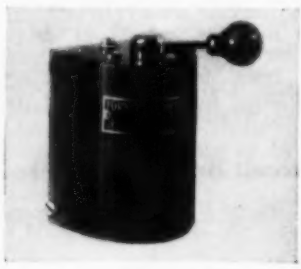


mounted on the side of the box. Switches have a complete interlock, quick-make and quick-break and a double-break device.

Switch, Drum, Style R1

Furnas Electric Co., 1525 S. 77th St., West Allis, Wis. (Vol. 77,p.514.) 230.

The Style R1 drum switch was developed for use with small bench lathes to reverse small motors. It may also be



used for plain starting and stopping where accurate control is an important consideration. Weight is 17 oz. The switch will control ½-hp., a.c. motors and ¼-hp. d.c. motors.

Switch, Mercury

Westinghouse Electric & Mfg. Co., E. Pittsburgh, Pa. (Vol.77,p.388.) 186.

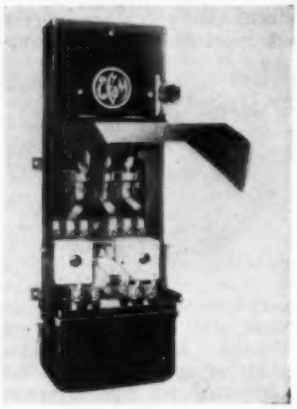
Six refractory — protected mercury switches are made in ratings from 3 to 50 amp., in the single-pole, single-throw type, and may be operated in

either a.c. or d.c. circuits. Contact is made by impact between two pools of mercury within a refractory chamber encased in heavy glass walls.

Starter, Magnetic, Across-the-Line

Electric Controller & Mfg. Co., E. 79th St. and Woodland Ave., Cleveland, O. (Vol.77, p.611.) 300.

For motors up to 15 hp., 220 volts, and 30 hp., 440-550 volts, the No. 1 Type ZOS oil-immersed, across-the-line, combination magnetic starter con-

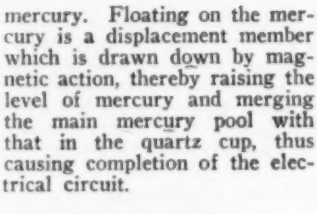


tains an unfused or fusible safety switch, a magnetic starter with overload relays and heavy-duty test jacks. Although designed for severe service, these starters are small and narrow.

Switches, Mercury

General Wire & Switch Co., 140 Benedict St., Providence, R. I. (Vol.77,p.352.) 149.

Both normally open or normally closed types of the "Mercrelay" mercury - type circuit controller are available. The top electrode has secured at its end a fused quartz cup partially immersed in the main pool of



mercury. Floating on the mercury is a displacement member which is drawn down by magnetic action, thereby raising the level of mercury and merging the main mercury pool with that in the quartz cup, thus causing completion of the electrical circuit.

Switch, Safety, Type A

Electric Controller & Mfg. Co., 2696 E. 79th St., Cleveland, O. (Vol.77,p.354.) 160.

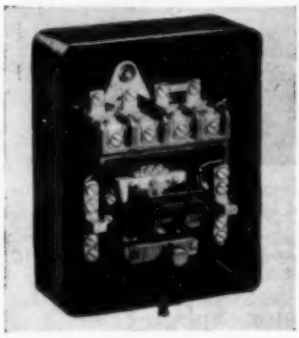
A line of compact safety switches in which nothing projects beyond the width of

the box and in which the cover swings vertically has features that comprise: semi-floating, double-break V-blades; V-type stationary contacts backed up with steel springs, individual barriers of arc-resisting asbestos, all mounted on a single base.

Switch, Starting, Solenoid-Operated

Allen-Bradley Co., 1311 S. First St., Milwaukee, Wis. (Vol.77,p.740.) 353.

A solenoid-operated, across-the-line starting switch rated at 5 hp. 220 volts; 7½ hp., 440-550 volts for polyphase motors and up to 1½ hp., 110 volts; 3 hp., 220 volts for single-phase, self-

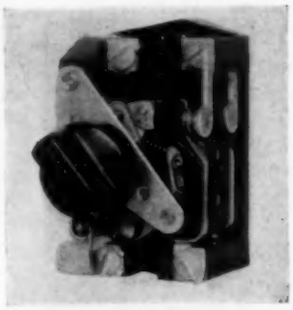


starting motors. The switch is made in 3 forms: Form 1 has start and stop push buttons, Form 2 is without push buttons for thermostat or remote pilot control and Form 3 has a 2-way, hand-automatic switch for try-out control installations.

Switch, Starting, Fractional-Hp.

General Electric Co., Schenectady, N. Y. (Vol.77,p.415.)

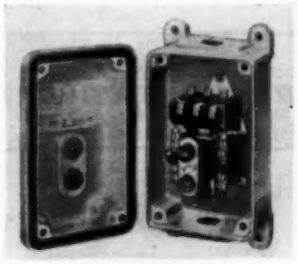
A small, hand-operated starting switch is for use with either single-phase a.c. or d.c. motors. The a.c. switch is available in single- and double-pole forms. Designated as Type CR-1061, it is available as: open type, inclosed-type, and for Class I, Group D hazardous locations.



Switch, Starting, Splash-Proof

Allen-Bradley Co., 1311 S. First St., Milwaukee, Wis. (Vol.77,p.321.) 151.

Hand-operated starter for motors up to 3 hp., 110 volts, 5 hp., 220 volts, and 7½ hp., 440 - 550 volts. Operating mechanism is identical to that

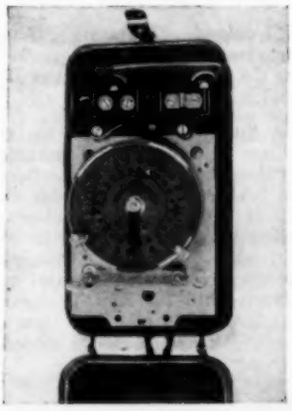


of the standard Bulletin 609 hand - operated starter. The cadmium-plated cabinets are provided with rubber cover gaskets.

Switch, Time, Automatic, Type T-15

General Electric Co., Schenectady, N. Y. (Vol.77,p.803.) 411.

This switch is for indoor service, has no cover gasket, is finished in black lacquer. The switch uses a Telechron motor

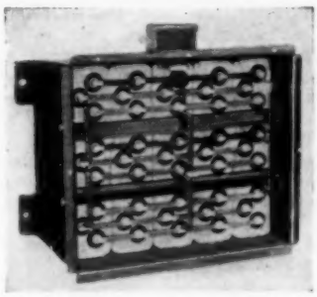


for timing device and mercury-to - mercury "Kon - nector" switches. Two adjustable riders, "on" and "off," give two operations every 24 hr. The 30-amp. switch is available in twelve forms and for 115 or 230 volts.

Capacitors, Power-Factor Correction

Ideal Electric & Mfg. Co., Mansfield, O. (Vol.77,p.804.)

Capacitors (static condensers) for power - factor correction have an efficiency of 99¾ per cent and a low temperature rise of 2 deg. C. They comprise an assembly of small independent,



hermetically sealed-can units. They are made for all voltages up to 4,600 and for any frequency and phase arrangement and in any size.

Lamp, Incandescent, Mill-Type

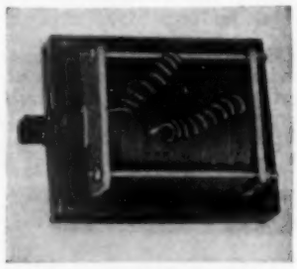
Hygrade Sylvania Corp., 500 Fifth Ave., New York, N. Y. (Vol.77,p.799.) 398.

A mill - type "Vibratuned" lamp in a 100-watt size is offered for situations where excessive vibration is present. Instead of a rigid structure to resist vibration the lamp provides a flexible structure that offers no resistance to vibration and actually sways in unison with the vibration.

Solenoids, "Trombetta"

Wrought Washer Mfg. Co., Milwaukee, Wis. (Vol.77,p.224.)

"Trombetta" solenoids will function at 200 operations per min. and on any frequency. They will also operate on d.c. current. Voltages are up to

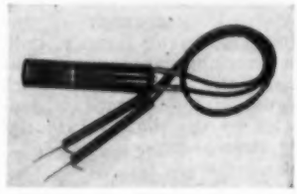


2,300. From these solenoids a force of 10 to 20 lb. may be secured to act through a distance of 1 to 4 in.

Tester, Voltage

Square D Co., Detroit, Mich. (Vol.77,p.224.) 86.

The tester registers the voltage and indicates whether it is a.c. or d.c. A.c. voltage



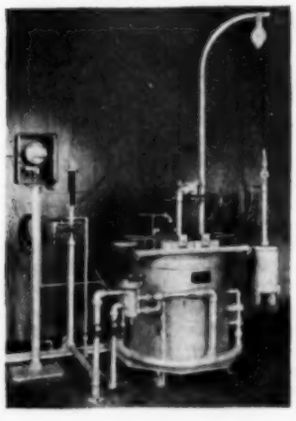
is shown by the slight vibration of the indicator. Because of its size, the tester may be carried in the pocket.

Furnaces and Equipment

Furnace, Bell-Type

American Gas Furnace Co., Elizabeth, N. J. (Vol.77,p.97.)

A bell-type retort furnace is adapted for use with hydrocarbon gas for carburizing and for use with ammonia for

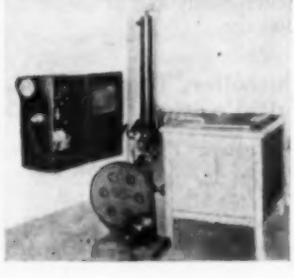


nitriding, or a neutral or inert gas for bright annealing. Equipment can also be used for hardening, normalizing, annealing and tempering. Extra bells are supplied according to the nature of the requirement.

Bath, Tempering, Electric

Harold E. Trent Co., 618-640 N. 54th St., Philadelphia, Pa. (Vol.77,p.547.) 252.

An electrically heated tem-



pering bath has an oil-circulating system that incorporates a pump. If the temperature rises too high, the oil is bypassed through a water-cooling column. A temperature control gage is supplied.

Furnace, Trough-Type, Electric

Harold E. Trent Co., Philadelphia, Pa. (Vol.77,p.516.)

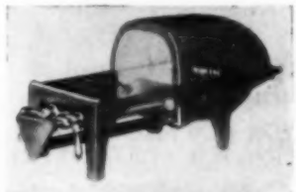
An electric furnace of the trough type can be used as a heat-treating bath with lead or salts. Illustration shows the

folded and formed furnace-type element and the method of lifting the trough crucible from the frame structure.

Furnace, Gas, Bench

Red Devil Mfg. Co., Bellwood, Ill. (Vol.77,p.451.) 200.

A firebox temperature of 1,800 deg. F. can be attained in the No. 20 gas bench furnace. Small carbon-steel tools, dies or parts can be heat-treated or

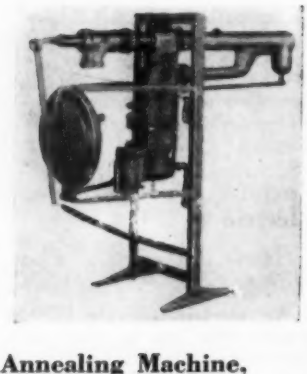


small quantities of metal can be melted. Dimensions: Length, 15 in.; height, 7 in.; firebox, 5½ in. long by 5 in. wide by 4 in. deep.

Gas-Generating Unit

Vapofier Corp., 2807 S. Michigan Ave., Chicago, Ill. (Vol.77,p.802.) 419.

A gas - generating unit equipped with a diaphragm control is claimed to operate satisfactorily on automatic temperature control. Neutral, oxidizing or reducing flame characteristics can be achieved. The Vapofier generates gas from No. 1 furnace oil, premixes this gas with the proper proportions of air and then conveys the pre-mixed gas to the burners.



Annealing Machine, Gas-Fired, Automatic

Selas Co., 18th St. and Indiana Ave., Philadelphia, Pa. (Vol.77,p.575.) 272.

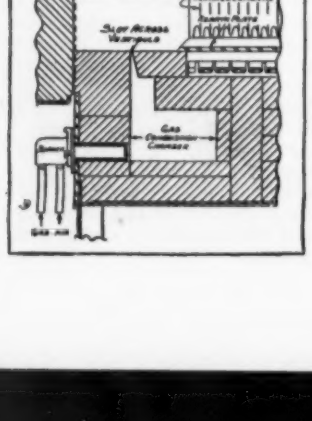
This automatic gas-fired annealing machine for spot heating of steel parts up to 2 ft. in diameter carries eight adjustable burners supplied with gas

premixed with air. Work is delivered at the rate of six pieces per minute. The machine will handle flat or formed pieces. It rotates continuously.

Atmosphere Control, Furnace

Hevi Duty Electric Co., Milwaukee, Wis. (Vol.77,p.93.) 21.

A small combustion chamber is built into the bottom of the furnace vestibule and has a slot opening into the vestibule and completely across it. Through this slot the products of combustion rise as a screen, displace

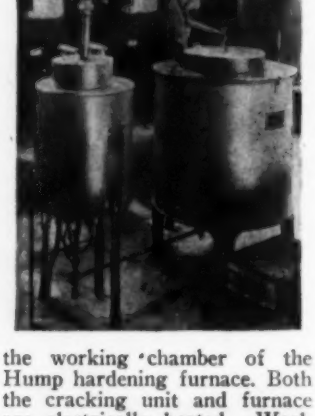


oxygen - bearing atmosphere present in the furnace chamber and prevent the admission of outside atmosphere.

Atmosphere Control for Hardening

Leeds & Northrup Co., 4901 Stenton Ave., Philadelphia, Pa. (Vol.77,p.706.) 359.

Protective pack hardening and coating of tool steels are not required in the "Vaporcarb" atmospheric control applied to the Hump method of hardening. A cracking unit delivers gas to

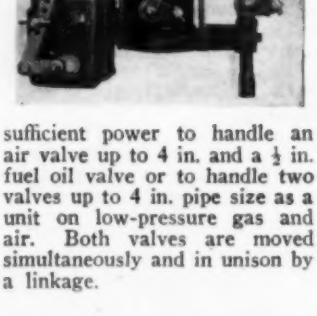


the working chamber of the Hump hardening furnace. Both the cracking unit and furnace are electrically heated. Work in the Hump furnace is protected by the slightly carburizing atmosphere.

Controller, Temperature, Motor-Operated

Automatic Temperature Control Co., Inc., 34 E. Logan St., Philadelphia, Pa. (Vol.77, p.354.) 143.

Type 2 motor-operated controller of the two-position type operates one or more valves as a unit. The controller has

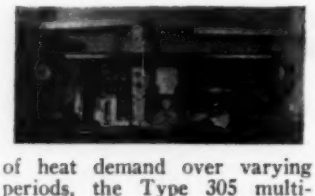


sufficient power to handle an air valve up to 4 in. and a ½ in. fuel oil valve or to handle two valves up to 4 in. pipe size as a unit on low-pressure gas and air. Both valves are moved simultaneously and in unison by a linkage.

Controller, Temperature, Multi-Position, Type 305

Automatic Temperature Control Co., 34 E. Logan St. Philadelphia, Pa. (Vol.77,p.512.)

For controlling industrial furnaces subject to wide variations



of heat demand over varying periods, the Type 305 multi-position controller has five separate contacts, two either side of the normal setting. Each intermediate contact between the extreme low and the extreme high contacts has two valve positions, so that, following a drop in temperature, fuel supply is greater than when the same contact is made following a rise in temperature. Thus, it is possible to assure a fuel supply more consistent with the fuel demand.

Cut-Out, Excess-Temperature

Hevi Duty Electric Co., Milwaukee, Wis. (Vol.77,p.804.)

The device can be applied to such equipment as gas, oil and electric heating apparatus. A thermocouple located in the heating chamber actuates the cut-out instrument, which in turn operates the cut-out control relay. A pilot lamp indicates whether the cut-out circuit is open or closed.

Material Handling Equipment

Roller, Gravity-Conveyor

Standard Conveyor Co., North St. Paul, Minn. (Vol.77,p.450.)

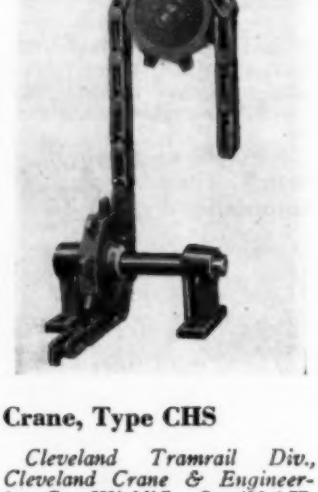
This gravity roller has ends formed in one piece to receive the bearing. A recess is formed in the end of the roller to receive a stationary dust shield

fastened on the inner ball race. A hexagon axle prevents the inner race from turning, and a correspondingly shaped hole is punched in the side rails, making a positive lock at this point.

Conveyor, 4-Way, "Flex Chain"

Standard Conveyor Co., N. St. Paul, Minn. (Vol. 77,p.798.)

The connecting lugs fit in machined surfaces to give the same action as a regular pintle chain. Smooth carrying surface permits stoppage of commodities on the chain, with the chain continuing in motion, without the usual bumping effect. The links consist of double U shapes. One set of lugs permits flexing the chain in one direction and the other set in a direction at right angles to the first.



Crane, Type CHS

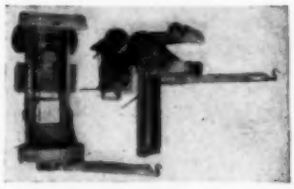
Cleveland Tramrail Div., Cleveland Crane & Engineering Co., Wickliffe, O. (Vol.77, p.611.) 293.

A line of cranes and transfer bridges of light weight, suitable for loads up to one ton where the bridge span is not over 16 ft., is suitable for hand-propelled carriers, either with or without chain - or motor - operated hoists, and operates on runways of Cleveland Tramrail standard rail or arch beam. Electrical fittings can be added.

Crane, Swinging-Boom, High-Lift

Yale & Towne Mfg. Co., Philadelphia Div., Philadelphia, Pa. (Vol.77,p.131.) 26.

The boom can be swung by hand 45 deg. from the center line in either direction. The crane has a capacity of 1,200 lb.

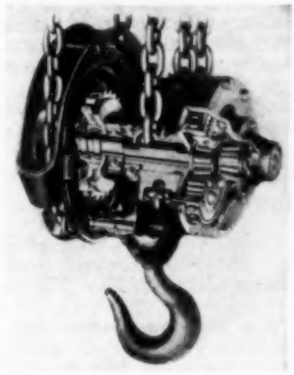


in any position. Due to the high lifting features of this crane, the hook can be varied from a height of 33 to 102 in.

Hoist, Chain, "Auto-Bloc"

David Round & Son, Cleveland, O. (Vol.77,p.130.) 54.

Either Timken roller bearings or ball bearings are employed. The hoist is compact and made in capacities from ½ to 20 tons.



It incorporates hardened and ground gears of drop-forged alloy steel. Alemite-Zerk fittings provide lubrication.

Hoist, Chain, "Hercules"

Chisholm-Moore Hoist Corp., Tonawanda, N. Y. (Vol.77, p.323.) 161.

The overload governor warns against dangerous overloads and

protects the hoist, load and operator against accidents. The adjustable load brake prevents self-lowering of the load. Gears are packed in grease. Capacities, ¼ to 40 tons.

Hoist, Electric

Coffing Hoist Co., Danville, Ill. (Vol.77,p.98.) 32.

An automatic balancing hinged hook and spring avoid a heavy counter-balance, and the balancing spring also acts as a cushion to prevent sudden or direct

jerks when lifting a load. Several speeds of operation are available. Capacities are ¼, ½, 1 and 2 tons. Lift is 8 ft.

Hoist, Electric, Twin-Hook

Electro Lift, Inc., 30 Church St., New York, N. Y. (Vol.77, p.801.) 386.

This hoist may be rigidly suspended or carried upon a trolley running on monorail track. It is built in capacities of 500 to 6,000 lb. The two

drums, operating together, are mounted on an extended drum shaft. Either rope control or automatic push-button control may be furnished.

Hoist, Drum, Wire-Rope

Chisholm-Moore Hoist Corp., Tonawanda, N. Y. (Vol.77, p.128.) 45.

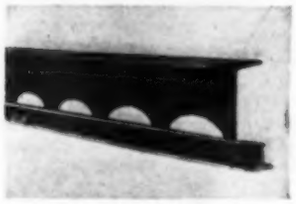
A compact combination of a "Cyclone" wire-rope hoist and a geared structural carriage has been developed for limited headroom and maximum lift. The hoist is for use on a double I-beam, overhead traveling crane. The unit is equipped with dual

chain sheave and two pendant hand chains. The larger sheave provides low-speed ratio for capacity loads; the smaller sheave high-speed ratios for light loads. Capacities of the hoist range from 3 to 30 tons.

Rail, Arch-Beam, 8-In.

Cleveland Crane & Engineering Co., Wickliffe, O. (Vol. 77, p.609.) 292.

Series 2,400 arch beam rail, designed for loads up to two tons, is for use where it is not practical to install superstructure between existing roof trusses for the support of the

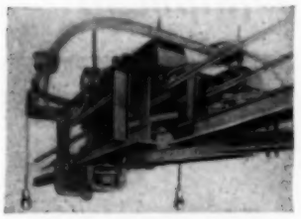


standard Tramrail rail. Spans, twenty feet or less. The arch beam rail is built of a half section of steel beam from the web of which semi-circular sections have been punched to form a series of arches. A Tramrail beam is welded on the bottom.

Switch, Tramrail, Type "D"

Cleveland Tramrail Div., Cleveland Crane & Engineering Co., Wickliffe, O. (Vol.77, p.610.) 294.

The Type "D" switch is suitable for all types of the company's hand-propelled carriers and for certain types of electrically operated carriers, but is more compact and permits a closer switch grouping and rail



spacing than is possible with the company's standard sliding-type switch. The switch consists of two main parts, a rigid outer frame and a sliding inner member fitted and guided to maintain alignment of the switch and incoming rails. The switch can be electrified at any time. Type E is similar but is suitable for use on hand-propelled carriers.

Trolley Unit with Rubber Drive Wheel

American Monorail Co., 13107 Athens Ave., Cleveland, O. (Vol.77,p.29.) 3.

A large pneumatic-tired wheel is used to drive on the bottom of the Monorail section. Wear of the rail is eliminated. The trolley makes use of motorized speed reducing units

available in all current characteristics and voltages as well as in speed reduction ratios. The drive permits the use of power travel on the narrow flange rails.

Tractor, Industrial, "Banty"

Mercury Mfg. Co., 4130 S. Halstead St., Chicago, Ill. (Vol. 77,p.797.) 397.

Weighing 2,700 lb., the "Banty" gas - powered tractor has over-all dimensions; length 73½ in.; width, 40 in., and turn-

ing radius, 54½ in. Maximum drawbar pull is 2,000 lb. at a speed of 2.5 m.p.h. Engine, clutch, transmission and rear axle are assembled as a unit to give a compact and sturdy mechanism.

Truck, Low-Lift, Heavy-Duty

Yale & Towne Mfg. Co., Philadelphia Div., Philadelphia, Pa. (Vol.77,p.97.) 24.

The Model K26S10 low-lift truck has a rated capacity of 10,000 lb. This truck is provided with six wheels. Load platform is 11 in. high in the low position, and the lift is 6

in. This is sufficient for skid-platform leg clearance when clearing door sills or other obstructions.

Truck, High-Lift, Tilting-Frame

Yale & Towne Mfg. Co., Philadelphia Div., Philadelphia, Pa. (Vol.77,p.130.) 25.

An electric truck that will pick up loose and bulky loads directly from the floor for transportation in a tilted position to storage, Model K31A is

rated at 4,000 or 6,000 lb. One power unit tilts the upright frame either 4½ deg. forward or 25 deg. backward. The other unit elevates the vertical traveling carriage. Height of the truck is 83 in.

Truck, Tiering, Ram-Type

Clark Tructractor Co., Battle Creek, Mich. (Vol.77,p.30.) 36.

For lifting, carrying and tiering strip steel and wire in coils, heavy wheels, dies, tires and machine parts of awkward shape, the "Tructier Ram" has

a ram 3 in. in diameter and 30 in. in length. The 2-ton model is capable of carrying the rated load at not more than 15 in. from the plate. A 3-ton model is also built. Optional minimum height of the ram ranges from 6 to 20 in., and maximum heights from 54 to 60 in. Truck is gas powered.

Truck, Assembly

Stackbin Corp., Providence, R. I. (Vol.77,p.803.) 420.

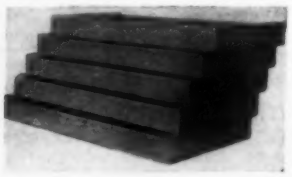
Bulky castings are placed in the larger compartments at the bottom, medium-size parts in compartments at about the middle, and small items such as

screws, bolts, nuts and cotter pins in the top sections. The standard Stackbin sections are stacked on an angle-iron platform frame.

Tray, Stacking

Stackbin Corp., Providence, R. I. (Vol.77,p.419.) 211.

An inexpensive type of stacking tray designed for storage of parts or finished products. Each tray is made so that one fits into another of the same size. Trays can be stacked to any convenient height.



Transmission Equipment

Speed Reducers, Worm-Gear

DeLaval Steam Turbine Co., Trenton, N. J. (Vol.77,p.158.) 58.

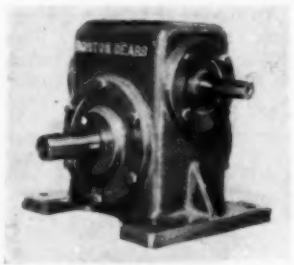
In the line of double-reduction worm gears greater flexibility in the arrangement of the drive is gained by using separate housings for the high-speed gear and the low-speed gear. The worm can be rotated either clockwise or counter-clockwise (facing the worm from the motor). The slow-speed shaft can be horizontal or vertical.

All gear tooth and worm surfaces are lubricated by splash.

Speed Reducers, Worm Gear

Boston Gear Works, Inc., North Quincy, Mass. (Vol.77, p.258.) 116.

Reduction ratios range from 10 to 1, up to 100 to 1; ratings from ½ hp. to 3 hp. Shaft diameters are oversize. The

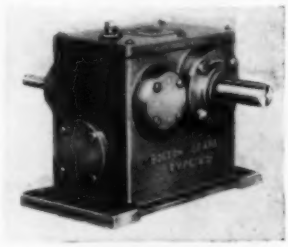


high-speed shaft is above the oil level. Timken roller bearings are employed on high- and low-speed shafts.

Speed Reducers, Types LD and HK

Boston Gear Works, Inc., North Quincy, Mass. (Vol.77, p.257.) 122.

The compound worm-gear Type LD is adapted for slow-moving driven members. It is available in ratios from 37.5 to 1740 to 1. Gears are of cast bronze and worms are of

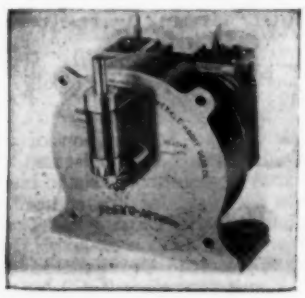


hardened steel with threads ground. The compound helical Type HK can be supplied in ratios from 9.79 to 84 to 1. This speed reducer is also equipped with Timken tapered roller bearings.

Speed Reducers, Low-Torque, Reversible

Merkle-Korff Gear Co., 213 N. Morgan St., Chicago, Ill. (Vol.77,p.30) 8.

This product consists of a reduction assembly with two-pole reversible motor. It is designed



to start, stop and run in either direction under the control of simple switching means. As standard, it is supplied for 115 volts, 60 cycles, operates at a full-load speed of 1,500 r.p.m. and no-load speed up to 2,600 r.p.m. Power consumption is 20 watts. Dimensions and depth, $3\frac{7}{16}$ in.; height, $3\frac{5}{16}$ in.; width $3\frac{11}{32}$ in.

Speed Reducers, Motorized

Janette Mfg. Co., 556 W. Monroe St., Chicago, Ill. (Vol. 77,p.128) 52.

Types RW-3 and RW-4 motorized speed reducers differ only in size. Between these two units it is possible to obtain motor horsepowers of from

⅛ to 5 hp. in polyphase or d.c. models, motor speeds being 1140, 860, 690, and 575 r.p.m. Twelve standard ratios range from 90:1 to 8:1. Both these speed reducers incorporate worm gear reduction units.

Speed Reducers, Motorized

Foote Bros. Gear & Machine Co., 5301 S. Western Blvd., Chicago, Ill. (Vol.77,p.159). 59.

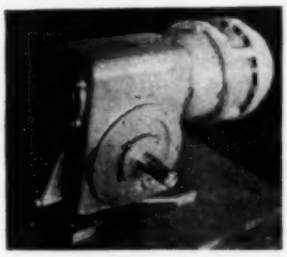
This line covers types ranging from ½ to 150 hp. capacity and ratios from 2 to 1 up to 3,600 to 1, the various types offered permitting use with right-

angle, straight line, or offset drives, either horizontal or vertical. Motor characteristics may include normal-starting-torque, high-starting-torque, high-slip, adjustable-speed and multi-speed. There are two main divisions of this line, the radiating worm-gear type and the helical gear type.

Speed Reducers, Motorized

D. O. James Mfg. Co., 1114 W. Monroe St., Chicago, Ill. (Vol.77,p.100) 20.

Motorized speed reducers from ½ to 20 hp. with a wide range of ratios and speeds are now built. The gears are of

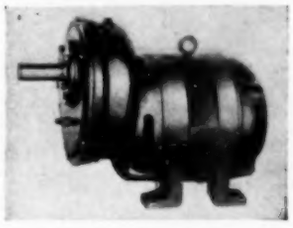


the continuous-tooth herringbone type, are mounted on antifriction bearings, and run in a bath of oil.

Speed Reducer, Motorized

Boston Gear Works, Inc., North Quincy, Mass. (Vol.77, p.130) 47.

The worm-gear speed reducer has been designed in combination with a standardized motor to form a compact unit.

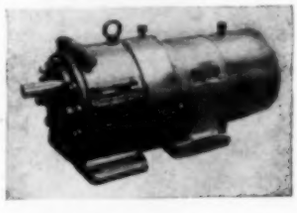


The worm and motor shaft are made integral to afford quietness and positive alignment.

Speed Reducers with Adjustable Output Shaft

Morrison Machine Co., 1171 Madison Ave., Paterson, N. J. (Vol.77,p.225) 98.

The output shaft is adjustable for distance above the floor. Loosening the clamp screw permits free rotation of the interior portion, and allows the spindle

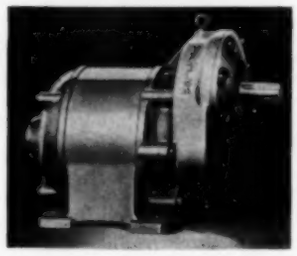


to be turned around the axis of the reducer. In a right-angle model, the right angle unit may be changed in relation to the main reducer to eight positions. A glass window indicates the condition of the oil level in either model.

Speed Reducer, Motorized, Geared-Head

Falk Corp., Milwaukee, Wis. (Vol.77,p.222) 106.

The design makes possible the use of high-speed motors instead of the more costly low-speed type, and provides any desired



speed from one-ninth motor speed to about two and one-half times the motor speed. Variation is secured with a simple single-pair gear train. Sizes, up to 15 hp.

Speed Reducers, Motorized, "Syncrogear"

U. S. Electrical Mfg. Co., Los Angeles, Calif. (Vol.77,p. 256) 121.

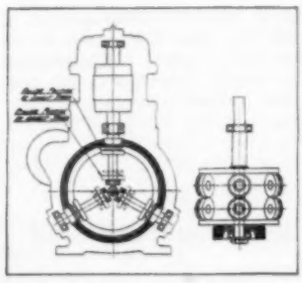
Furnished for any output speed from 2 to 10,000 r.p.m., "Syncrogear" motor comprises a self-contained, single-base, geared transmission, foundationed on a heavy pedestal base. Helical gears and pinions give

smooth power flow. Accessibility permits removal for inspection of either the gears or the electric rotor unit without disturbing other members. The motor employed is the standard high-speed type of 3,600 r.p.m. or lower.

Speed Reducer, Motorized

Merritt Engineering & Sales Co., Inc., Lockport, N. Y. (Vol.77,p.259) 123.

A variable-speed power unit of the disk and roller traction type, this "Stanley" speed variator has a speed range of 3 to 1 with an infinite number of speeds between these limits. A built-in motor forms part of the unit known as Type S. Types SR and SSR contain, in addition to the motor, speed reduction gearing. The variator is offered in units of 2 to 20 hp. Three pairs of driving rollers arranged radially about the output power shaft are driven from the built-in motor. A pair of disks, secured to the output shaft, receive their motion

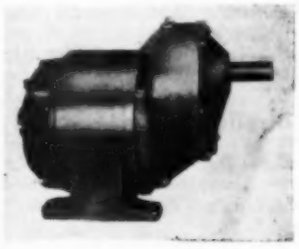


through frictional contact with the driving rollers. Radial adjustment of the rollers effects the speed of rotation of the output shaft.

Speed Reducers, "Gearmotor," Type S

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. (Vol.77,p.259) 125.

The Type S Gearmotor is scarcely longer over-all than a motor. It is designed for drives from ½ to 75 hp. and for speeds from 1,550 to 232 r.p.m. It can be connected di-



rect to driven equipment or by cog belts, chains or flat belts. Fourteen reductions of ratios from 1.12:1 to 5.1 are available for each motor speed and horsepower.

Speed Reducers, Motorized, "Gearmotor," Type S

Reliance Electric & Engineering Co., 1042 Ivanhoe Rd., Cleveland, O. (Vol.77,p.353) 170.

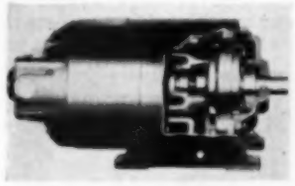
Type S gearmotors rated ¾ hp. and up are now available. The cartridge-type gear unit contains all gears and bearings except the high-speed pinion and

bearing. The ratio can be changed by changing the high-speed pinion and gear. Rotating the cartridge gear unit provides from four to eight positions of the output shaft. Gearmotors can be supplied for a wide range of ratios with either d.c. or a.c. motors in wanted characteristics.

Speed Reducers, Motorized, Fractional-Hp.

General Electric Co., Schenectady, N. Y. (Vol.77,p.385.) 192.

Two types of fractional-horsepower gear - motors are available, both types in ratings from ⅛ to ¾ hp. The concentric-shaft type is built with speeds from 500 to 98 r.p.m., and the right-angle shaft type is made

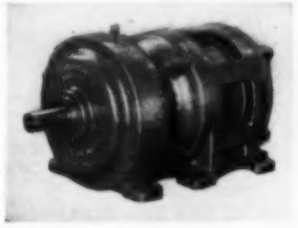


with speeds from 200 down to 11 r.p.m. The gear-motors utilize planetary gearing with concentric shafts in the smaller ratios and worm gears singly or in combination with the planetary type in the higher ratios.

Speed Reducer, Motorized, "Planigressive"

Planigressive Reducer Sales Co., Milwaukee, Wis. (Vol.77, p.576.) 276.

Type A reducers are built integral with the motor in sizes from ¾ to 15 hp., and ratios of 3:1 to 7:1. Type B compound speed reducers are made in standard reduction ratios of 8:1

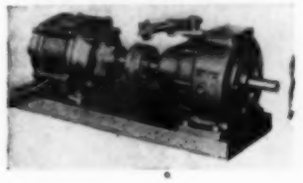


to 24:1. Type C speed increasers have ratios 1:1.1 to 1.5. This line is made in sizes from 3.4 to 15 hp. Type D reducers are made in ratios from 25:1 to 600:1. Sizes range from ½ to 100 hp.

Reduction Unit, Variable-Speed

Smith Power Transmission Co., Penton Bldg., Cleveland, O. (Vol.77,p.258.) 114.

A self - contained infinitely variable speed reducer, this "Johnson" unit runs in a bath of oil, uses a control that is

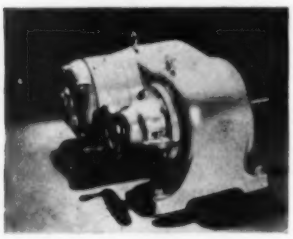


quickly manipulated, and is stopped instantly. Capacities from 1 hp. up are built.

Transmission, Variable-Speed, "Varidrive"

U. S. Electrical Mfg. Co., Los Angeles, Calif.. (Vol.77, p.225.) 102.

Variable speed combinations from 25 to 10,000 r.p.m. can be controlled in steps as fine as 1 r.p.m. The drive consists of a constant-speed squirrel-cage

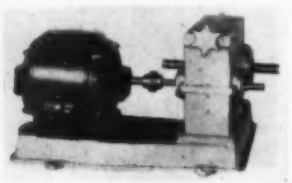


motor and a variable-speed differential which comprises dual disks coupled with a "Varibelt." The differential disks reciprocally expand and contract for higher or lower speeds.

Transmission, Variable-Speed

Lenney Machine & Mfg. Co., Warren, O. (Vol.77,p.94.) 19.

Infinitely adjustable speed control is furnished by this variable-speed transmission unit built in sizes up to 1 hp. Speeds obtainable are as fol-



lows: 1,150 r.p.m. input—10 to 100 r.p.m., infinitely variable: 1,750 r.p.m. input—15 to 150 r.p.m., infinitely variable. The unit is irreversible.

Transmission, Variable-Speed, Vertical

Reeves Pulley Co., Columbus, Ind. (Vol.77,p.702.) 328.

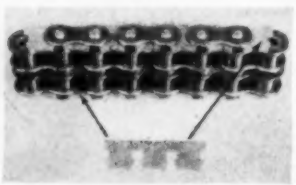
A completely inclosed, vertical, variable-speed transmission less than 14 in. in over-all

height, this No. 0000 unit has a cast-iron case that protects the operating parts. Centralized force-feed lubrication is featured. Specifications: Dimensions—width, 11¼ in., thickness, 7$\frac{7}{16}$ in.; infinite speed adjustment, from 2:1 to 6:1; capacity, ½ to ¾ hp.

Chain, Anti-Back-Bend

Whitney Mfg. Co., Hartford, Conn. (Vol.77,p.161.) 68.

A device for prevention of vibration and whip in roller and silent chain drives consists of a small wedge-like element which is assembled into standard chains at every pitch. The

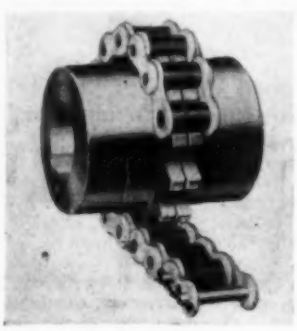


wedges contact end-to-end and form a continuous stiff backbone throughout the length of the chain. The elements float on the chain rivets and do not interfere with the normal action of the chain joint.

Coupling, Flexible

Link-Belt Co., 910 S. Michigan Ave., Chicago, Ill. (Vol. 77,p.224.) 100.

The coupling consists of two cut-tooth sprocket wheels and a piece of Type "RC" Silverlink roller chain. A pin-and-cotter link makes it easy to



couple or to remove the chain. The coupling can be inclosed in either a stationary or revolving, automatically lubricated, oil-retaining casing.

Coupling, "4-Duty"

Falk Corp., Milwaukee, Wis. (Vol.77,p.514.) 238.

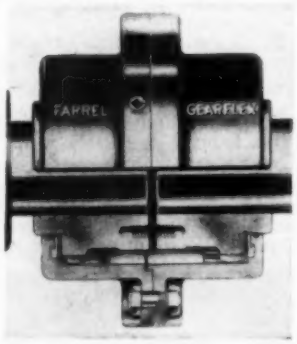
The four functions are: starting, coupling, cushioning and limiting the load. The construction involves two drum-shaped members, one attached to the driving shaft and the other to the driven shaft. Between the driving and driven members are inserted two sets of floating segments, made usually of brake lining rein-

forced with lead. Centrifugal force causes the starting shoes to grip the driven shoes. Combined capacity of driving and overload shoes is equal to 140 per cent of normal motor running torque. Ratings 3 to 400 hp.

Couplings, "Gearflex"

Farrel-Birmingham Co., 344 Vulcan St., Buffalo, N. Y. (Vol.77,p.578.) 273.

The double-engagement type of coupling shown consists of two externally geared hubs keyed to two shafts and engaging an internally geared floating sleeve that incases the hubs. With two sets of spur



gears, one at each end of the floating sleeve, misalignment is compensated for by the sleeve assuming a neutral position between the two shafts. The reservoir between the hubs and sleeve carries lubricant.

Coupling, Flexible, Roller-Chain

Whitney Mfg. Co., Hartford, Conn. (Vol.77,p.578.) 284.

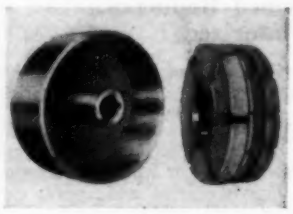
This coupling consists of two roller chain sprockets coupled together with the company's roller chain. Clearance between

the two sprockets allows for slight shaft misalignment. The cover provides oil lubrication and protection from dirt.

Coupling, "Zobell-Waterhouse"

Zobell Electric Motor Corp., Garwood, N. J. (Vol.77,p.803.)

The coupling consists of a starting section and a service

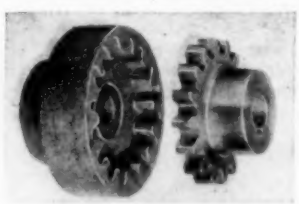


section. Each section consists of a ring of segments operated by centrifugal force. Starting-section segments are rotated by the drive shaft. Service segments are designed so that centrifugal force at load speed allows this section to carry the full load.

Coupling, Sprocket, "Celeron"

Continental-Diamond Fibre Co., Bridgeport, Pa. (Vol.77, p.834.) 432.

The sprocket coupling has the female end molded of "Celoron" and the other half a steel sprocket. Seven standard sizes are built. each one of which is

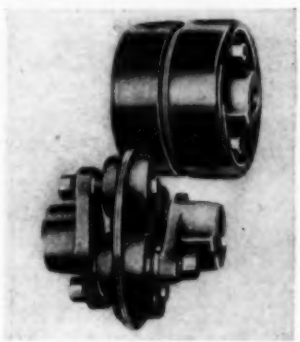


designed to cover a wide range of horsepower output. The No. 1 coupling, for example, can be used on ½- to 4-hp. drives at speeds from 100 to 6,500 r.p.m.

Coupling, Flexible, "Morflex"

Morse Chain Co., Ithaca, N. Y. (Vol.77,p.836.) 439.

The flexing member is a complete unit comprising four molded, non-cold-flow, rubber trunnion blocks spaced 90 deg. apart and set under pressure into

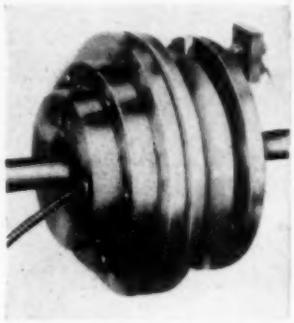


a two-piece riveted steel housing. The rubber trunnion blocks are provided with steel cores. Two diametrically opposite blocks are bolted respectively to the arms of the steel driving and driven flanges.

Clutch and Brake Unit

Magnetic Mfg. Co., Milwaukee, Wis. (Vol.77,p.223.) 101.

The dual purpose is to provide for clutch and brake action on motor-driven spindles. The magnetic clutch is 10 in. in diameter and has a torque rating of 1,000 in.-lb. It is

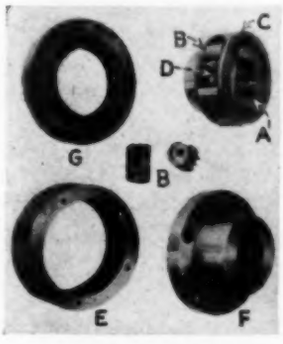


mounted inside the driven sheave. The magnetic brake is 8 in. in diameter, with a torque rating of 850 in.-lb. The armature is used for both clutching and braking.

Clutch, Free-Wheeling

Kelpo Clutch Co., 216 Mill St., Rockford, Ill. (Vol.77, p.128.) 40.

The one-way or free-wheeling clutch has a special tooth form, and the larger number of cams increases the life and the factor of safety. The complete line now includes standard clutches up to 10 in. shaft

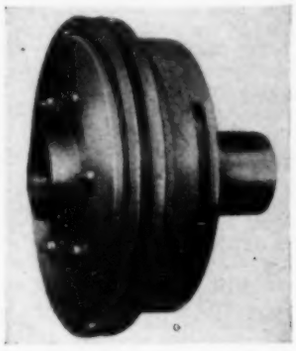


diameter. When the drive gear *A* is rotated in the driving direction, it turns the cams so that they grip the case and drive the load. When the load shaft rotates faster than the prime mover shaft the clutch free-wheels, the cams allowing the case to slip past them freely.

Clutch, Magnetic, Safety-Type

Magnetic Mfg. Co., Milwaukee, Wis. (Vol.77,p.641.) 307.

This style of clutch is mechanically closed by powerful springs, and opened magnetically,



whereas on the standard clutch the closing is accomplished magnetically and the opening by mechanical means. The clutch is suitable for continuous engagement or where the clutch is disengaged only at infrequent intervals. Whether current is available or not, the clutch will remain engaged.

Clutch, Magnetic Multiple-Disk, Style C

Magnetic Mfg. Co., Milwaukee, Wis. (Vol.77,p.708.) 352.

Ranging from 6 in. in diameter and larger the clutch can be built for either wet or dry operation. Impregnation

against moisture is provided. Clutches are built with from two to eight disks.

Clutch, Multiple-Disk, Pneumatic

Ajax Mfg. Co., Euclid Branch P. O., Cleveland, O. (Vol.77,p.736.) 367.

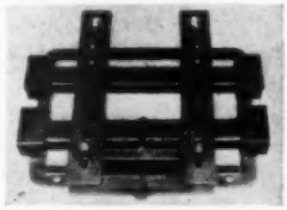
Quick - acting, pneumatically operated clutches for use on forging machines, presses, bulldozers and similar equipment are built in capacities from 100 to 1,000 hp. per 100 r.p.m. Pressure is applied to the friction surfaces by introducing compressed air behind an annu-

lar piston acting directly upon the plates. Compression springs retract the piston and disengage the plates when the air pressure is released. The flywheel and its driving parts are carried upon anti - friction bearings. Friction-plate diameters are 18 21, 24 and 30 in.

Motor Base, Sound-Isolating

General Electric Co., Schenectady, N. Y. (Vol.77,p.290.) 137.

Floating members of the sound isolating motor base, are suspended on specially developed isolating material which is inclosed and mounted to prevent damage. The motor itself is mounted on a standard sliding

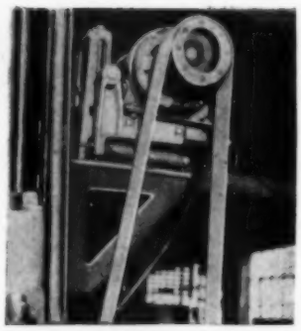


base. Belt tension and motor alignment are maintained in the ordinary manner. Bases are available for the following motor ratings and speeds; Polyphase induction motors of 1 to 50 hp., 900 r.p.m.; ¾ to 30 hp. 1,200 r.p.m.; 1 to 3 hp., 1,800 r.p.m.; and single-phase motors of ½ to 2 hp., 900 r.p.m.; ½ to 2 hp., 1,200 r.p.m.; 1 to 5 hp., 1,800 r.p.m.

Motor Base, Vertical-Drive

Rockwood Mfg. Co., Indianapolis, Ind. (Vol.77,p.770.) 400.

The difference between the standard horizontal drive base and the vertical drive base is that in the latter the force producing belt tension is derived from coiled springs rather than from the weight of the motor. When the motor is located

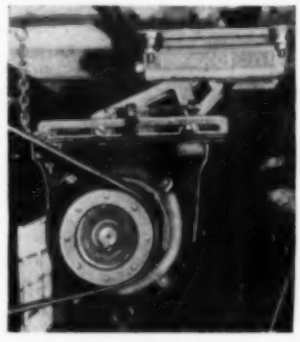


above the driven pulley, the springs are adjusted to support the entire motor weight plus the necessary belt tension. When the motor is located below the driven pulley, the springs are adjusted to support only that portion of the motor's weight not needed to provide belt tension.

Motor Base, Ceiling-Drive

Rockwood Mfg. Co., Indianapolis, Inc. (Vol.77,p.800.)

The ceiling drive base has special hanger arms which suspends the motor horizontally and gives greater clearance from the ceiling. The adjustable steel angles, which move horizontally on the hanger arms, are supported by a ledge cast on the bottom of the hanger arms. Design of the ledge permits the screws to be loosened and the adjustable angles to be moved along the ledge by turning the secondary arm screws.



Welding Equipment

Welding Set, Arc, Model S.A.

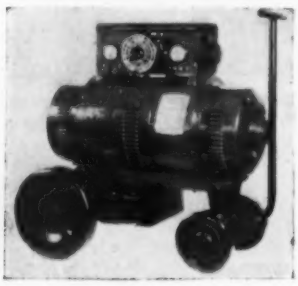
Wilson Welder & Metals Co., Inc., North Bergen, N. J. (Vol.77,p.94.) 28.

A four-bearing, self-excited, dual-control arc welder, known as the Model S.A., is built for high amperage and arc voltage required in speed and shielded-arc welding. It is a two-unit machine with a flexible coupling, which permits the changing of the motor or the generator in case of failure. By means of the dual-control system, the voltage and amperage may be set independently. The welder does not require an exciter, and gives sparkless commutation.

Welding Set, Arc, Improved

Hobart Bros. Co., Hobart Square, Troy, O. (Vol.77, p.100.) 34.

Sixty per cent more capacity is provided in the improved arc welder which is fitted for handling both coated rods at 42



volts and plain rods at 25 volts. The remote control permits the operator to weld at a distance of 50 to 100 ft. away from the welder.

Welding Set, Protected-Arc

USL Battery Corp., Niagara Falls, N. Y. (Vol.77,p.609.)

With a welding range of 50 to 550 amp. and a rating of 40 volts, all kinds of bare or coated electrodes can be handled. Armatures on the motor, gen-

erator and exciter are all mounted on a single shaft to eliminate mis-alignment. Heavy-duty ball bearings are employed on the shaft to maintain a uniform gap. Inclosure of the mechanism prevents damage.

Welding Head, Arc, Automatic

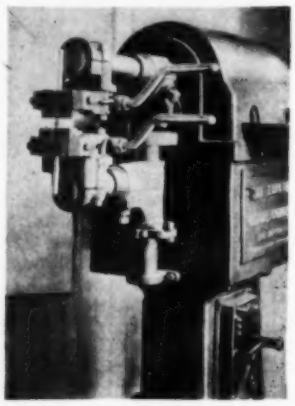
Una Welding, Inc., 1615 Collamer Ave., Cleveland, O. (Vol.77,p.798.) 383.

Either the automatic head or the work may be moved to weld the seam. The welding head gives accurate control of arc length by the use of two independent electric motors operating against each other through differential gears. The front cover plate carrying the feed nozzle can be set to give angular adjustment of the welding rod with respect to the work.

Welding Attachment, Tee

Acme Electric Welder Co., 5621-23 Pacific Blvd., Huntington Park, Calif. (Vol.77,p.739.)

One attachment is used on the lower horn of a spot welder for tee welding, while for performing butt-welding operations, two attachments are employed, one

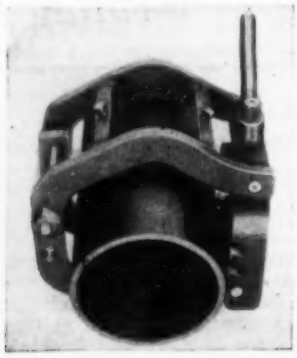


on the lower horn and one on the upper horn. Jaws take any size wire from No. 16 gage up to ½ in. in diameter. The jaws are actuated by a cam on the offset handle. The attachment may be operated either right- or left-handed.

Clamp, Pipe-Welding, "Bull Dog"

Oster Mfg. Co. and the Williams Tool Corp., Cleveland, O. (Vol.77,p.672.) 288.

This adjustable pipe welding clamp is of open construction to leave a large amount of space for tacking. The tool is made



in two sizes, the first to take pipe from 4 to 6 in.; the second, 8 to 12 in. Pipe is automatically centered for welding and is held rigidly. Equipped with spacers, the tool eliminates adjusting the space between two lengths of pipe for efficient welding.

Electrodes, Mineral-Coated

Metal & Thermit Corp., 120 Broadway, New York, N. Y. (Vol.77,p.446.) 223.

One is a special electrode designed for welding "Cromansil" steel, a high-strength steel having a tensile strength of 80,000 to 100,000 lb. per sq.in., along with high ductility. The second electrode deposits a metal containing 4 to 6 per cent chromium and 0.5 per cent molybdenum, specially suited to the welding of refinery equipment.

Goggle, Transparent

Willson Products, Inc., Reading, Pa. (Vol.77,p.321.) 152.

The "blinder" feeling is eliminated by the transparent cup goggle. Light passes through the walls of the cup undimmed. The goggle has more room than ordinarily and is well ventilated. It can be used with or without spectacles.

Spectacles, Welding, "Oxweld"

Linde Air Products Co., 30 E. 42nd St., New York, N. Y. (Vol.77,p.546.) 266.

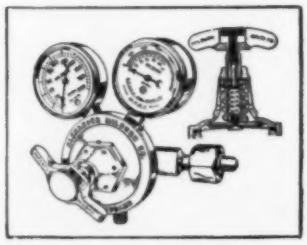
In No. 15 welding spectacle the lenses are 50 mm. in diam, to permit wider angle of vision and greater protection against

light and sparks. Type AA lens, flat-ground and polished, is made in light, medium and dark green shades.

Regulator, Welding, Micrometer-Adjustment

Alexander Milburn Co., 1416-1428 W. Baltimore St., Baltimore, Md. (Vol.77,p.419.) 201.

A regulator for use with oxygen, acetylene and other gases has two compression

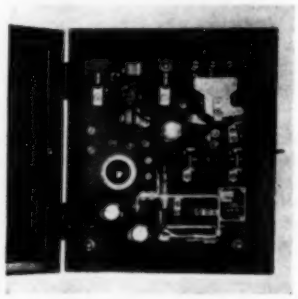


springs, one within the other to operate a removable metal diaphragm. The main key operates the heavy spring, and the micrometer adjustment key a fine bronze spring that enables the operator to secure pressures from zero to 5 lb.

Timer, Weld, Automatic

Electric Controller & Mfg. Co., 2690 E. 79th St., Cleveland, O. (Vol.77,p.545.) 247.

For use in connection with resistance welding machines this automatic weld timer does not provide a definite amount of time for each weld, but varies the time automatically in inverse proportion to the rate of

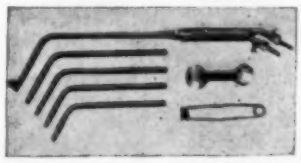


current flow in order to produce a satisfactory weld at each operation. It consists of a rectifier tube which charges a fixed condenser. When the charge reaches an amount sufficient to pass current through two neon-gas-filled tubes, a small relay is operated which in turn opens the relay controlling the main line contactor.

Torch, Welding, "Purox," No. 28

Linde Air Products Co., 30 E. 42nd St., New York, N. Y. (Vol.77,p.31.) 9.

The No. 28 torch is similar in general to the No. 20, but has some differences in design. Ten one-piece, 60-deg. goose-neck tips, from Nos. 6 to 15, are available for use with this

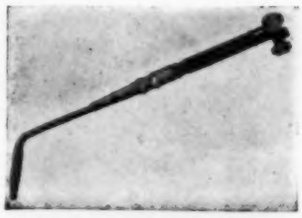


torch, giving a range from 16-gage sheet to heavy castings. By using the "Purox" No. 21 cutting attachment, steel up to 2 in. thick can be cut.

Torch, Welding, "Rego" GX

Bastian-Blessing Co., 240 E. Ontario, St., Chicago, Ill. (Vol. 77,p801.) 391.

Concentration of heat is the feature. The long inner cone



in the flame is responsible. It is the result of a streamline construction by which the mixed gases flow through the torch without turbulence. The torch has an effective range of tip sizes from Nos. 20 to 72 drill size for the welding of the heaviest locomotive frames down to 24-gage sheet metal.

Flux, Aluminum, "Oxweld"

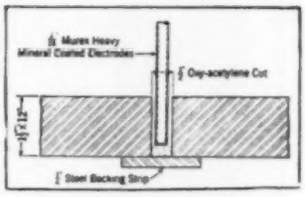
Linde Air Products Co., 30 E. 42nd St., New York, N. Y. (Vol.77,p.545.) 267.

This flux is intended to replace the two fluxes previously marketed, one for welding pure aluminum and the other for welding aluminum alloys. The flux is packed in ¼-lb. jars.

Welding Process, Straight-Gap, "Murex"

Metal & Thermit Corp., 120 Broadway, New York, N. Y. (Vol.77,p.320.) 169.

Welding without veeing or grooving plate edges can be undertaken by the straight-gap welding method. Plates are lined up with the edges parallel, and a steel backing strip is used to close the bottom of the gap. Then, with the current



raised slightly, the weld is built up layer upon layer. The electrode is moved from side to side in the gap while welding and is tilted to wash away some of the plate edge. The slag is removed from each layer. Suitable electrodes are marketed.

Alloys and Steels

Alloy, Heat-Resisting, "Nichrome V"

Driver-Harris Co., Harrison, N. J. (Vol.77,p.287.) 133.

"Nichrome V" nickel-chromium alloy may be used as a heating element material in the following electric furnaces: heat-treating carburizing, annealing, cyaniding, nitriding, melting, enameling, patenting and bright annealing. The alloy is furnished in the form of wire, ribbon and rod.

Bars, Phosphor-Bronze

Bunting Brass & Bronze Co., Toledo, O. (Vol.77,p.255.) 115.

Machined and centered phosphor-bronze bars are 13 in. long instead of the conventional 12 in. to avoid cutting-off losses and are furnished with sufficient stock on the outside diameter to allow a finished bushing to be machined to the size labelled on the bar.

Iron, "Super Manga"

Robins Conveying Belt Co., 15 Park Row, New York, N. Y. (Vol.77,p.833.) 435.

"Super Manga" nickel-chromium cast-iron for abrasion-resisting applications has a martensitic structure with a refined carbide network which contributes to its uniform hardness, strength and toughness. A chilled surface will show a Brinell hardness of 600-750 and chill depth can be controlled and a tough grey core provided. Wear tests have shown a life two to twelve times longer for Super Manga iron than for plain chilled iron.

Steel, Deep-Drawing, "Armco"

American Rolling Mill Co., Middleton, O. (Vol.77,p.513.)

A deep-drawing sheet metal is said to have the following properties: high ductility; uniformity of physical properties; ductility not impaired by temper cold rolling; permanent freedom from stretcher straining in the tempered condition, and no change with lapse of time in respect to ductility, yield point, tensile strength, and hardness. The material is free from blue brittleness.

Steel, Screw, Bessemer

Jones & Laughlin Steel Corp., Pittsburgh, Pa. (Vol.77,p.574.)

Improved machinability of the SAE 1112 and the special high-sulphur screw steels made by the above has been secured by improved manufacturing procedure and not by variation of analysis. An increase in feed or greater speed, or both, combined with longer tool life, have resulted. Production increases ranging from 11 to 99 per cent have been secured. Improved quality of parts is based on the coolness and smoothness with which the stock works, the absence of chatter and ragged tearing. Physical properties are improved.

Steels, Stainless, Stabilized

U. S. Steel Corp., Room 1602, 208 S. LaSalle St., Chicago, Ill. (Vol.77,p.288.) 132.

Announcement has been made of development of a method of stabilization of 18-8 (18 per cent chromium, 8 per cent nickel) stainless steels with titanium addition. This development removes the hazard of intergranular corrosion, a phenomenon which has been a serious factor in installations where heat-treatment is impracticable after welding and in cases where these steels are used in applications involving high temperatures.

Sheets and Plates, Nickel-Clad

H. Boker & Co., 103 Duane St., New York, N. Y. (Vol.77, p.449.) 202.

Hot-rolled, annealed and pickled sheets from No. 16 U.S.S. gage up to and including heavy plate sizes, and also cold-rolled sheets and strips with polished surface as thin as No. 32 gage are made by hot welding a slab of pure nickel to a steel base. The nickel surface can be applied on one or both sides. Nickel-clad wire can also be supplied.

Parts and Mechanisms

Ball Bearings, Annular, Double-Row

Hoover Steel Ball Co., Ann Arbor, Mich. (Vol.77,p.516.)

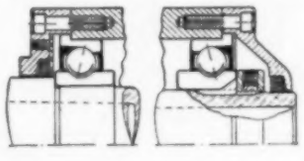
Light, medium and heavy series, double-row ball bearings, identified as the Nos. 5200, 5300 and 5400 series respectively, are of the deep-groove

type, have large thrust capacity in either direction in addition to the radial capacity. Formed steel retainers of the riveted type are used for spacing the balls.

Bearings, Ball, Flanged

New Departure Mfg. Co., Bristol, Conn. (Vol.77,p.836.) 436.

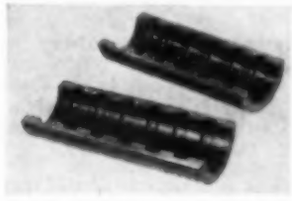
The shoulders are on the bearing instead of in the housings. It is possible to bore housings straight through at one set-up, thereby assuring alignment. The bearings are separable for quick and easy assembly. Inner rings are extra wide to assure non-deflecting seating and are key-slotted so that they may be locked to prevent creeping about the shaft, and preload is applied through the inner rings. These precision spindle bearings are supplied in sizes from 30 to 130 mm. bore, and are obtainable in two bore sizes for each standard outside diameter.



Bearings, Non-Metallic, Molded

Gatke Corp., 228 N. LaSalle St., Chicago, Ill. (Vol.77,p.323.)

A special textile base, impregnated with synthetic resins and molded under high pressure, is used for bearings manufactured in all shapes and sizes.

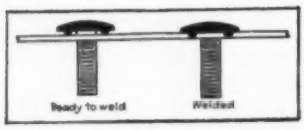


Hydrotex bearings run in water for lubrication. Lubritex bearings are designed for oil lubrication. Grafitex bearings are self-lubricating and are made for slow - moving machinery. These bearings can be molded with inserts and no machining is necessary. Journal diameters range from ⅛ to 24 in.

Bolt, Welding

Ohio Nut & Bolt Co., 600 Front St., Berea, O. (Vol. 77, p.27.) 13.

The prongs or lugs on the bolt head provide for projection welding to sheet metal, using resistance welding machines. Type G1 has the weld-

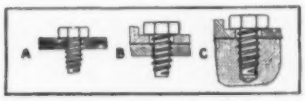


ing lugs on the bottom of the head. Type G2 has the welding lugs on the top of the head, and has the advantage of leaving one side of the sheet clear of obstructions.

Capscrews, Self-Tapping

Parker - Kalon Corp., 200 Varick St., New York, N. Y. (Vol.77,p.161.) 66.

Self - tapping capscrews can be used to make fastenings to sheet metal from 24 to 10 gage; to steel plate and structural shapes up to ½ in. thick, and to



solid sections of brass, bronze, aluminum as well as die-castings, slate, transite board, and ebony asbestos. These capscrews are made in a range of sizes from No. 6 to ½ in. in diameter.

Fittings, Pipe, Steel

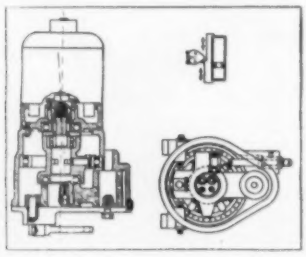
Taylor Forge & Pipe Works, P. O. Box 485, Chicago, Ill. (Vol.77,p.513.) 239.

Fittings for light-wall piping and Taylor spiral pipe are fabricated from No. 10 gage steel by welding and are die-formed. Center-to-end dimensions conform to the 125-lb. American Standard. Fittings are furnished plain end or flanged, or flanged at one end only. They are suitable for hydraulic pressures of 200 lb. per sq.in., are easily welded into piping installations.

Hydraulic Generator, Self-Contained

B. A. Wesche Electric Co., 1622-1628 Vine St., Cincinnati, O. (Vol.77,p.385.) 177.

The generator is of the variable-delivery type, and the rotor carries five pistons mounted as a pendulum. Reactance to the generated oil pressure is taken on a spring mounted in the cartridge, one end of which is in contact with a piston under pressure. In this way the rotor is held in equilibrium until displaced by the screw, plunger or

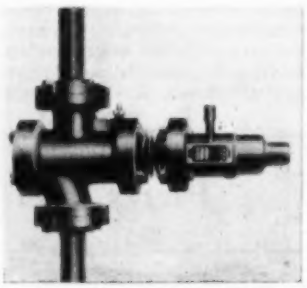


cam adjustment. By changing the spring the pump can be made to operate at any pressure up to 5,000 lb. per sq.in. Reversal of the work-operating piston can be controlled electrically or mechanically.

Meter, Flow, Area-Type

Brown Instrument Co., Philadelphia, Pa. (Vol.77,p.322.) 140.

Heavy oils for heat-treating furnaces must be heated in order to flow freely. If the oil will flow through the pipe it will flow through the body of the area-type meter and it is



measured directly. The fluid passes under a piston, through the orifice, and is then discharged. The piston slides vertically, exposing the rectangular orifice.

Oiler, "Opto-Matic"

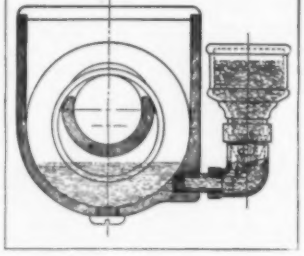
Trico Fuse Mfg. Co., Milwaukee, Wis.. (Vol.77,p.227.)

An automatic, visible lubricating system for ring or ball-bearing shafts, the "Opto-Matic" has micrometer adjustment to permit a wide range of oil levels which can be secured by turning the reservoir.

Oilers, Automatic

Speedway Mfg. Co., Cicero, Ill. (Vol.77,p.514.) 243.

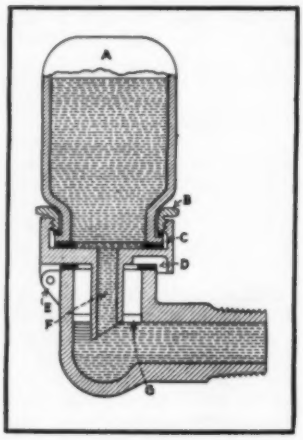
The "constant - level" oilers are for use on electric motor bearings and other reservoir bearings. The "thermal" oilers are applied to machine bearings and are automatic in operation. Oil level in the bearing is held at the same height as the opening of the short tube in the inverted bottle cap. As soon as the oil gets below this level, air enters the jar through the tube, and oil flows out through the long tube until the level is raised enough to seal the opening in the short tube.



Oilers, Constant-Level

Gits Bros Mfg. Co., 1846 S. Kilbourn Ave., Chicago, Ill. (Vol.77,p.641.) 318.

Style HL, shown, is used on electric motors for a visible reserve oil supply that automatically maintains a constant level. Bottle *A* is turned down and filled through the constant-

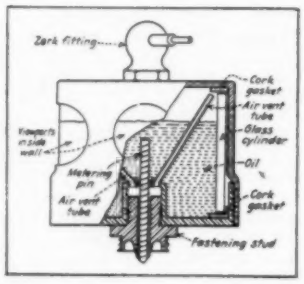


level tube *F*. In Style BL, the bottle is removed to refill. Style CL, constant-level oiler is a hinged type but has a clamp that holds the bottle securely.

Oiler, Industrial

Hallenger Oiler Sales, 630 St. Jean Ave., Detroit, Mich. (Vol.77,p.675.) 326.

The patented metering pin is adjusted so that one drop of oil per minute, or more or less, is furnished. Oil capacity is sufficient for a ten-hour shift. Ports

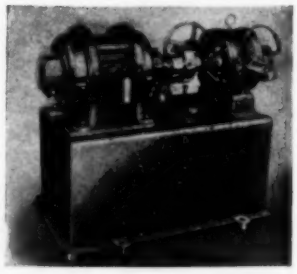


afford visibility of the supply. The air vent in the oil reservoir insures a consistent gravity feed.

Power Units, Hydraulic

Hydraulic Press Mfg. Co., Mt. Gilead, O. (Vol.77,p.515.)

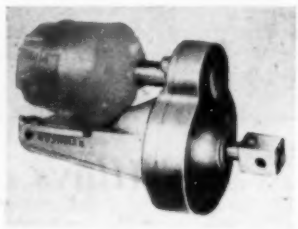
These units incorporate a radial-pump pressure generator, direct-driven from an electric motor. Both pump and motor are mounted on a base inclosed to serve as a reservoir for the oil used as pressure fluid and lubricant. Each machine served by one of these units becomes self contained and independent of other machines. Pressure output may be adjusted up to 3,000 lb. per sq.in.



Power Unit, Pull-Push

Cushman Chuck Co., Hartford, Conn. (Vol.77,p.577.)

A motor-driven, non- rotating power unit that will exert a constant force in either direction for the full length of the stroke, can be connected to the machine by means of a lever, toggle or other device. A high-torque motor transmits power to a pinion through a coupling. An abutment on one-half of the



coupling fits loosely into a slot in the other half.

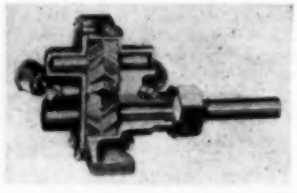
Before picking up the load, the motor makes several free revolutions. On the rotatable nut and the gear there are abutments. When these abutments contact, the motor is running at full speed, causing the abutment on the driven gear to deliver a powerful blow to the abutment on the nut to aid in releasing the pressure on the gripping parts.

The force developed, dependent on the size of the motor, ranges from 3,000 to 35,000 lb. Drawbar movements, 4 and 8 in.

Pumps, Gear

M. L. Oberdorfer Brass Co., Syracuse, N. Y. (Vol.77,p.227.)

Rotary, bronze gear pumps are made in standard sizes from ⅛ in. to 1½ in. intake and outlet, standard pipe connections, in both spur and herringbone gear



types. They have double bearings, are fully lubricated and are positive in action. Pumps can be operated in vertical or horizontal positions.

Motorpumps, Geared

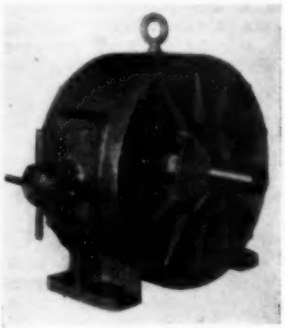
Brown & Sharpe Mfg. Co., Providence, R. I. (Vol.77, p.547.) 242.

Horizontal and vertical "Motorpumps" have advantages where a power takeoff is not handily located or possible. Spiral gears in pump and reduction drive afford quietness. Pumps speeds, either 600 or 900 r.p.m. Capacities: No. 101, 3 to 4½ gal. per min.; No. 102, 6 to 9 gal.; No. 103, 12 to 18 gal.

Pumps, Hydraulic, Rotary, Series 5000

Northern Pump Co., Minneapolis, Minn. (Vol.77,p.129.)

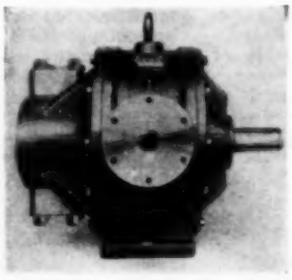
Hydraulic pumps and motors of the rotary, radial-piston type are available in sizes from 1 to 200 gal. per min. and pressures up to 4,000 lb. per sq.in. The volume of discharge can be varied. A complete line of automatic controls and semi-automatic valve mechanisms is also available.



Pumps, Hydraulic, Radial

Hydraulic Press Mfg. Co., Mount Gilead, O. (Vol.77, p.320.) 164.

A radial pump for generating pressure employed in operating hydraulic powered machinery has been placed on the market. It is of the positive-displacement, multiple-radial-plunger, oil-pressure type. Output is variable in volume and reversible in direction of flow. Six sizes are built, ranging from 1 to 100 g.p.m., with pressure capacities up to 3,000 lb. per sq.in.



Motorpump, Centrifugal, No. 210

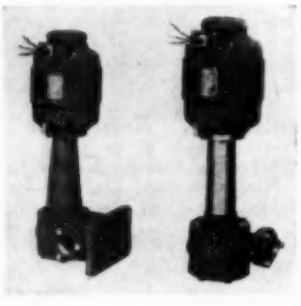
Brown & Sharpe Mfg. Co., Providence, R. I. (Vol.77, p.512.) 241.

For supplying coolant and liquids that contain dirt, chips or abrasive particles. The design permits mounting the pump either outside or inside the tank. Suction pipe, 1½ in.; discharge pipe, 1¼ in.

Pumps, Coolant, Vertical, Motor-Driven

Ruthman Machinery Co., Cincinnati, O. (Vol.77,p.323.)

Twin suction intake, accomplished by two compartments communicating independently with the lower and upper sections of the impeller, maintains hydrostatically balanced thrust. The totally inclosed motor has a bowl-shaped disk fan above the windings. Reversible housing enables changing the relation of the discharge with the intake to either right- or left-handed.



Pump, Rotary, Motor-Driven

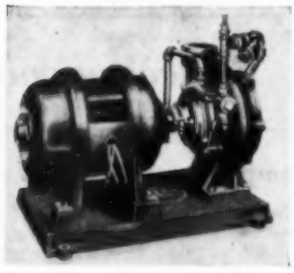
DeLaval Steam Turbine Co., Trenton, N. J. (Vol.77,p.291.)

Motor-driven and turbine-driven rotary displacement pumps for supplying oil at constant pressure to burners so that the oil will be atomized uniformly at all times. The pump employed is the "IMO" type (*AM.*—Vol. 76, p. 1210). The pump illustrated is designed to supply 2½ gal. per min. of bunker C oil at 100 deg. F. against a pressure of 100 lb. per sq.in.

Pump, Single-Suction, Self-Priming

Buffalo Pumps, Inc., Buffalo, N. Y. (Vol.77,p.384.) 148.

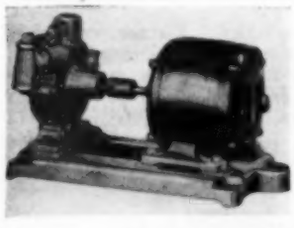
A built-in self primer is a feature of the Type CP single-suction pump. Two types of impellers are available on sump service. Wherever liquids are not clear the open type is recommended, while for all other services the inclosed impeller is commonly supplied. The pump is built in several sizes in capacities up to 450 g.p.m., and for heads up to 150 ft.



Pump, Turbine, Type "T"

Roots-Connersville-Wilbraham, Connersville, Ind. (Vol. 77,p.418.) 204.

Type T regenerative turbine pump for handling from 5 to 300 g.p.m. at heads up to 350 ft. employs a patented taper-edge impeller which makes it possible to vary the quantity while the pump is running. Impellers are made of bronze in the standard pumps with a seal-type packing gland on both sides, thus keeping lubricant out of the impeller channel. The pumps may be had in various alloys.



Rollers for Bearings

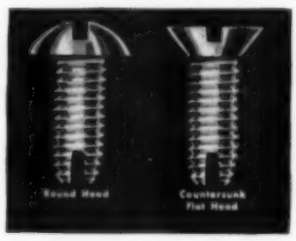
Bantam Ball Bearing Co., South Bend, Ind. (Vol.77,p.97).

Rollers are made in sizes ranging from 0.0625 to 0.1880 in. diameter and with tolerances of +0.0001 in. to +0.002 in. These rollers are used where the operating conditions require large bearing capacity, and are commonly known as "needle bearings."

Screws, Self-Tapping

Kellogg Switchboard & Supply Co., 1066 W. Adams St., Chicago, Ill. (Vol.77,p.802.)

A standard thread is employed on the hardened self-tapping screw known as the "Tapster." The screw has balanced flutes and twin-cutting edges and is said to accomplish a tapping operation at the same time it is driven and not merely to push the metal aside. It is available in all standard sizes with standard heads.



Screws, Thumb, Cold-Forged

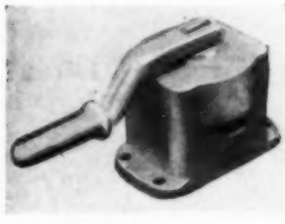
Parker-Kalon Corp., 200 Varick St., New York, N. Y. (Vol.77,p.576.) 275.

Cold-forged thumb screws from $\frac{3}{16}$ in., 24 threads per inch by ¼ in. long to ⅜ in., 16 threads per inch, by 3 in. long are roll-threaded. Thumb grips are well shaped, are free of burrs and roughness, and will take a plated finish.

Valve, Air-Control

Q-C Engineering Products, 1310 Maple St., Detroit, Mich. (Vol.77,p.191.) 44.

The 4-way "Sav-Air" valve of the poppet type obtains its name from the fact that air bled from the right-hand to the left-hand side of the piston will perform the return movement. Thus, one-half of the cycle uses no air from the line. A "Pedair" foot control valve is also available to permit the operator to



use both hands for productive purposes and still afford means of applying air as required.

Valve, "Unitite"

Hanna Engineering Works, 1765 Elston Ave., Chicago, Ill. (Vol.77,p.256.) 124.

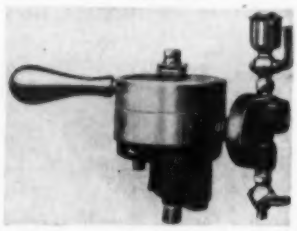
Disk and valve bonnet may be reground without removing valve body from the pipe line. Disk rotates on two eccentric points while in contact with the

seats to eliminate scoring. The valve is of the packless type and is suitable for air, oil or water at pressures up to 250 lb. per sq.in.

Valve and Filter, Air

Detroit Tool & Forge Co., 656 Smith Ave., Detroit, Mich. (Vol.77,p.544.) 259.

The "Minard" economy air valve and oil filter can be used in connection with any double-acting air cylinder. The valve returns the compressed air from

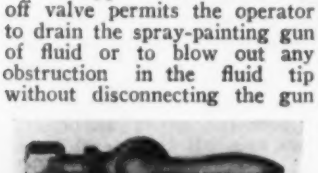


the exhaust side to the live side of the cylinder, and allows only enough live air to pass through the auxiliary valve to operate the attached equipment.

Valve, Cut-Off, Spray-Painting

DeVilbiss Co., Toledo, O. (Vol.77,p.800.) 418.

The Type H-5135 fluid cut-off valve permits the operator to drain the spray-painting gun of fluid or to blow out any obstruction in the fluid tip without disconnecting the gun

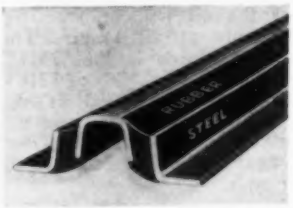


from the hose. When the lever is turned horizontally to the rear a port in the side is opened as the fluid passage is closed. When the trigger is pulled, air pressure and suction drain the fluid from the fluid passage. By covering the nozzle, any obstruction in the tip may be blown back and out the vent.

Vibration Dampener

Firestone Tire & Rubber Co., Akron, O. (Vol.77,p.385.) 185.

A vibration dampener that can be cut to length, or used in any number of lengths. Standard lengths are 12, 24 and 36 in. Three densities or hard-

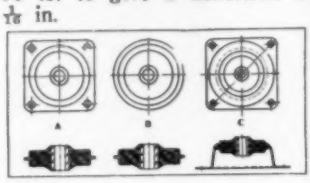


nesses of rubber compound afford a wide range of load capacities. This device is made by bonding cushion strips of rubber between pieces of brass-plated metal. The central inverted metal "U" carries the load, and the extended metal feet on either side are bolted to the foundation. The dampener carries the load in shear.

Vibration Mountings

Lord Mfg. Co., Erie, Pa. (Vol.77,p.320.) 159.

Standardized plate - form mountings to protect instruments and machinery from shock and vibration are made in three designs, square plate, round plate and stamped holder. The rubber is bonded to the metallic elements and takes the stress in shear. They are many times as stiff radially as axially. This permits a suspension comparatively stable in any desired direction and very soft, with a low natural frequency in the direction of the vibratory thrusts. All three types are made in load ratings from 1 to 90 lb. to give a deflection of ⅛ in.

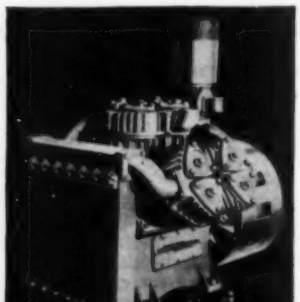


Miscellaneous Equipment

Compressor, Air-Cooled

Ingersoll-Rand Co., 11 Broadway, New York, N. Y. (Vol. 77,p.610.) 296.

The "Motorcompressor," compressor has a built-in electric motor, the rotor being carried on the compressor shaft and the frame being bolted to the compressor crankcase. It is a



2-cylinder, 2-stage machine. Cylinders and intercooler are air-cooled. Units are built in sizes from 20 to 50 hp. with piston displacements from 113 to 310 cu.ft. per min. and for discharge pressures up to 125 lb. gage.

Compressor, Air

Chrysler Motors, Amplex Div., 7900 Jos. Campau Ave., Detroit, Mich. (Vol.77,p.546.)

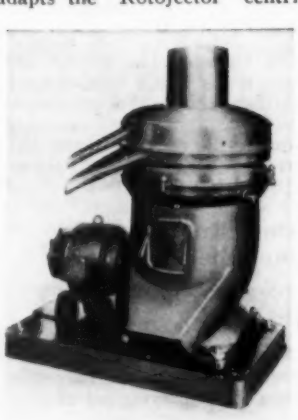
A special four-cylinder air compressor, a V-belt driven, four-cylinder industrial engine with two radiators, air tank

and accessories mounted on a rigid frame and carried on two pneumatic tired wheels with springs make up the equipment. The feature is the governing control which allows the compressor to operate at speeds in proportion to the demand for air.

Centrifuge, "Rotojector"

Sharples Specialty Co., 23rd & Westmoreland Sts., Philadelphia, Pa. (Vol.77,p.225.) 90.

A quick bowl-cleaning feature adapts the "Rotojector" centri-

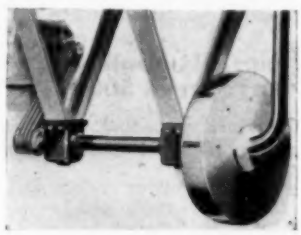


fuge to separation of fine metal chips from cutting compounds, particularly where the amount of solid dirt is excessive. The "Rotojector" will operate continuously on liquids containing a relatively high percentage of solid materials. It discharges bowl cake while running at full speed.

Cleaning Device, Abrasive

American Foundry Equipment Co., Mishawaka, Ind. (Vol.77,p.544.) 260.

A mechanical abrasive cleaning device, which does not require compressed air, the "Wheelabrator" utilizes centrifugal force to throw abrasive upon the work which passes

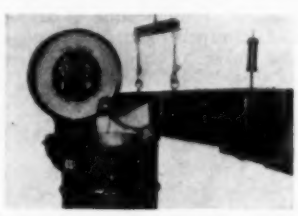


beneath. It is claimed that one "Wheelabrator" is equal in production and quality of cleaning to six abrasive blast nozzles, ¼ in. size, at 90 lb. air pressure. Power requirements do not exceed 10 hp.

Packaging Machine, Vibrator-Type

Toledo Precision Devices, Inc., Toledo, O. (Vol.77,p.95.)

Packaging of such parts as nails, pins, washers and nuts, which are ordinarily difficult to handle, can be done with this vibrator filling machine. This

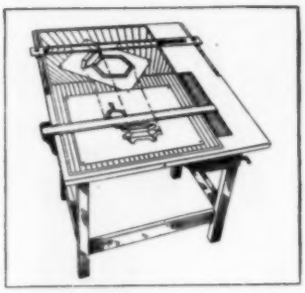


device controls the automatic feed of the materials from supply bins to the scales and the automatic weighing out of predetermined amounts in packaging operations. It consists of a Toledo scale, an "electric eye" cutoff attachment and a vibrator holding the articles to be packaged. The equipment is capable of filling as many as 200 one-pound containers per hour to a tolerance of 1/64 oz.

Perspective Machine

Calibron Products, Inc., West Orange, N. J. (Vol.77,p.160.)

The equipment consists of a perspective drawing mechanism mounted on a drafting table.

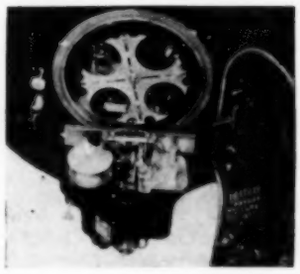


Operations are (1) Set the straight-edge on a point in the plan view by turning the crank which operates the cylinder and sliding straight - edge; (2) Project horizontally the corresponding perspective height of this point from the cylinder chart, using a T-square; (3) Follow the lines on the specially ruled paper from the point on the plan to the T-square to find the desired perspective point. The principal points are connected to obtain a full true perspective.

Scale, Weight-Printing

Toledo Scale Co., Toledo, O. (Vol.77,p.834.) 395.

Printed weight records are provided by the "Figured Type" Printweigh scale. The device can be furnished on dial scales of 62½ to 10,000 lb. capacity

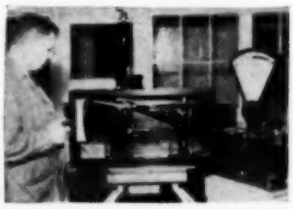


and can be attached to any late model Toledo scale of similar capacity. It prints in 1/10 of a sec. at the touch of a button.

Weigher, Dynamic

Toledo Precision Devices, Inc., Toledo, O. (Vol.77,p.129.) 49.

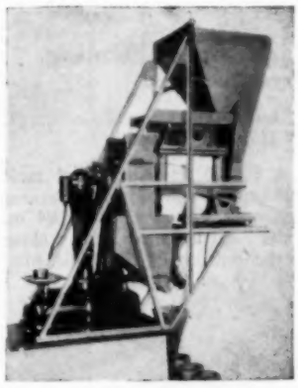
A dynamic weigher classifies parts to close tolerances and rejects over-weight and under-weight parts, determines the mass of an article or commodity by measuring inertia while the scale is in motion—hence the name, "Dynamic Weigher." Articles weighing several pounds can be measured to an accuracy of a few grains.



Weighing and Filling Device

Toledo Precision Devices, Inc., Toledo, O. (Vol.77,p.513.)

Small metal products can be weighed and placed in packages by the improved precision weighing and automatic filling device. This device will weigh as high as 1,000 1-lb. packages

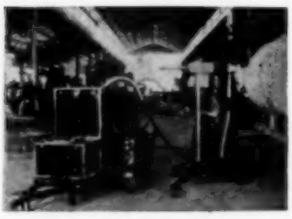


per hour to an accuracy of 1/16 oz. All drafts are net weighings, the weight of the container not being included.

X-Ray Equipment, Portable, "Metalix"

Industrial X-Ray Corp., 665 Chamber of Commerce Bldg., Los Angeles, Calif. (Vol.77, p.482.) 215.

Available in three sizes, the "Metalix" apparatus employs the primarily useful beam of the X-ray. Biologically harmful rays are absorbed at the source. The "Metalix" No. 200



consists of three components: A high-voltage generator housed in a metal container; a control box, and two shock-proof, high-voltage cables connected to the "Metalix" tube. The following materials may be examined: Iron up to 3½ in. thick (with special apparatus up to 4 in.); copper, bronze and brass up to 2½ in. thick, and aluminum up to 10 in. thick.

Blast Helmet, Type "DF"

Pangborn Corp., Hagerstown, Md. (Vol.77,p.29.) 14.

This Type "DF" helmet employs filtered washed air, of which the flow can be regulated. Seepage of dust from underneath the rubber cape is prevented by a dust-proof cloth cape which can be drawn up by

easy-running draw strings. For the comfort of the operator the adjustable sweatband may be adjusted to any size or shape of head.

Call System, Factory

Webster Mfg. Co., 3825 W. Lake St., Chicago, Ill. (Vol. 77, p.701.) 345.

The standard set consists of a portable amplifier for the master station, a push-button microphone and one to five speakers, located at strategic places throughout the premises. The message is relayed and broadcast through all the loud speakers on the circuit.

Copper Lining for Burnishing Barrels

Abbott Ball Co., Hartford, Conn. (Vol.77,p.291.) 147.

A self-locking copper lining has been developed for ball burnishing barrels. Design of the lining sets up additional movement in the barrel to afford quicker finishing and also acts as a burnishing medium. Maintenance costs are also said to be lower.

Cream, Hand-Protecting

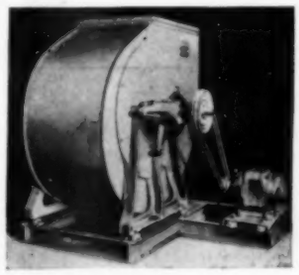
Magnus Chemical Co., Garwood, N. J. (Vol.77,p.739.)

"Skin - Gard" cream when rubbed upon the skin is quickly absorbed and forms a dry invisible protective film that prevents the pores of the skin from becoming clogged with grime. "Skin-Gard" is removed with water and all dirt and grease is removed with it.

Base for Fans, Silent

Buffalo Forge Co., Buffalo, N. Y. (Vol.77,p.417.) 205.

To provide an inexpensive means of insulating a fan and

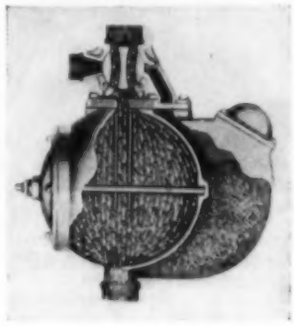


its driving motor from building foundations, the silent floating base illustrated has flexible rubber insulators that prevent metal contact between the holding-down bolts and the fan. The rubber mountings are in shear rather than in compression.

Filter, Coolant, "Sorwal"

Fostoria Pressed Steel Corp., Fostoria, O. (Vol.77,p.447.)

The "Sorwal" coolant filter employs a non-metallic filtering material. The accompanying illustration shows the normal operation of the filter. Coolant is forced through the globe containing the filtering material.

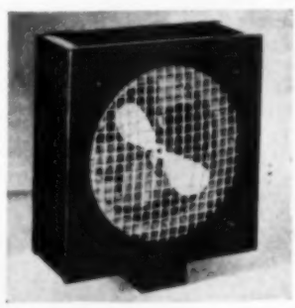


By turning the valve from the grinding to the flushing position, the coolant flows through a by-passage also filled with filtering material, and back through the main filtering chamber and out through a drain pipe to the receiving tank. At the same time a shaft through the main chamber causes agitation of the filtering medium for thorough cleansing.

Heaters, Unit, Electric

Edwin L. Wiegand Co., 7577 Thomas Blvd., Pittsburgh, Pa. (Vol.77,p.706.) 348.

For auxiliary, temporary or permanent installation in hard-to-heat places, "Chromalox" electric unit heaters draw air in from all four sides and over

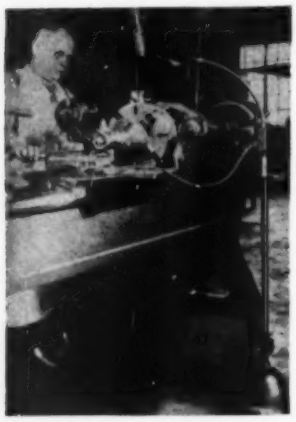


the heating elements of large area. It is then picked up by the fan. The heater is said to circulate a greater volume of heated air and to produce a more uniform temperature. Heaters are made in ratings of 1.5 to 4.5 kw. Automatic temperature controls are available.

Lighting Fixture, "Adaptalite"

Appleton Electric Co., 1701 Wellington Ave., Chicago, Ill. (Vol.77,p.130.) 42.

A portable lighting fixture, the "Adaptalite" has a heavy base and upright standard, which can be raised or lowered.



A flexible arm and half reflector comprise the fixture. The base has a reel with 15 ft. of rubber-covered cord.

Lubricant, Metallic-Lead-Base

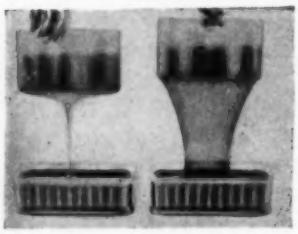
Armite Laboratories, 1450 E. 51st St., Los Angeles, Calif. (Vol.77,p.609.) 289.

Finely divided metallic lead is the protective element in "Bestolife" lubricant. The product forms a thin protective film of lead on all contacting surfaces, and is claimed to improve the anti-frictional characteristics. Principal application are gear and roller bearings and as belt dressing.

Lubricants, "Sta-Put"

E. F. Houghton & Co., 240 W. Somerset St., Philadelphia, Pa. (Vol.77,p.640.) 313.

With high film strength because of a special polymerization treatment, "Sta-Put" lubricants are made in three



series and are available in grades for almost any type of industrial equipment. The 300 series are liquid. The 400 series are made for gear lubrication. The 500 series are of grease consistency. They feed freely, are moisture free, and will not harden or separate.

Lubricating Pastes for Packings

Garlock Packing Co., Palmyra, N. Y. (Vol.77,p.257.) 141.

Proper and regular lubrication of packings in service is essential to successful operation. Compound No. 2 is for steam and water packings and compound No. 3 for packings working against gasoline and oils.

Die Coatings and Mold Dressings, "Bonis"

St. John X-Ray Service, Inc., 30-20 Thomson Ave., Long Island City, N. Y. (Vol.77, p.833.) 431.

"Bonis" die coatings and mold dressings are for die-casting dies and permanent molds for non-ferrous metals. These materials are applied under air pressure and are said to fill the pores and fine cracks. As a result castings have a smooth surface appearance and a good finish.

Rustproofing Compound

Stonhard Co., 401 N. Broad St., Philadelphia, Pa. (Vol.77, p.835.) 421.

A transparent compound having rust-arresting and rust-preventing properties contains materials that neutralize existing rust or rusting agents present in rust and in the pores of the base metal. The compound also provides a moisture-proof and air-tight film to maintain this passive condition. Upon drying the material eventually becomes hard and dry on the surface, but retains tackiness next to the metal which prevents it from being affected by atmospheric changes and vibration.

Tank, Spray-Painting, Pressure-Feed

DeVilbiss Co., Toledo, O. (Vol.77,p.640.) 306.

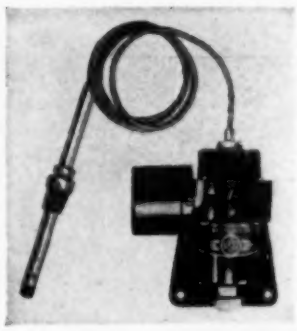
A 60-gal. pressure feed tank for spray-painting operations measures 39½ in. high by 24 in. wide. An agitator works close to the bottom of the tank, pre-

venting accumulation of pigment. Regular equipment includes pressure regulator and gage, safety valve, relief valve, two air and two fluid outlets.

Thermostat, Bearing

Electric Controller & Mfg. Co., 2700 E. 79th St., Cleveland, O. (Vol.77,p.671.) 335.

Leaflet 1120 bearing thermostat consists of a sealed metallic tube, containing a volatile liquid which is connected, directly or through flexible copper tubing,



to a one-piece seamless metal bellows. A rise in temperature of the bearing causes the volatile liquid to expand. The contacts open and shut down the machine. The thermostat operates at 100 deg. C., or at other temperatures on order.

Thermometer Controller, Mercury-Switch

Brown Instrument Co., Philadelphia, Pa. (Vol.77,p.835.) 338.

The use of mercury switches to eliminate open make-and-break contacts controlled by the pen arm is a feature of this automatic control thermometer. Every six seconds a motor-driven control table determines the location of the pen on the chart in reference to the control setting, and tilts the mercury switch from one side to the other if the temperature has changed. With this system the measuring mechanism is free to position itself unhampered by the control mechanism.

X-Ray Paper

St. John X-Ray Service Corp., 505 Fifth Ave., New York, N. Y. (Vol.77,p.384.) 181.

This X-ray paper is said to be cheaper than film, dries faster and needs only one intensifying screen instead of a pair. Two sheets are exposed simultaneously in one cassette. This has the advantage that one negative can be retained while the other one goes along with the material.

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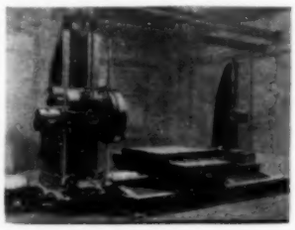
Boring and Turning Machines

Boring Machine, Horizontal

G. Richards & Co., Ltd., Broadheath, near Manchester, England. (Vol.76,p.650E.) 20.

This Pearn-Richards machine is without traversing spindle, but capacity is somewhat larger than of the regular No. 6. The upright and boring stay is 2 ft. 6 in. higher and the bed 1 ft. 7 in. longer, the facing capacity being 6 ft. 6 in., as against 6 ft. Longitudinal movement of the tables is 8 ft., cross-traverse 9 ft. 5 in., and the center of the main spindle can be adjusted to 96¾ in. above the main table. Spindle speeds in 24 steps from 1 to 89 r.p.m. can be had, while eight feeds to the surfacing slide range from 0.02 in. to 0.25 in. per rev. and the eight feeds to the vertical head and the tables from 0.01 to 0.25 in. Rapid power traverse is provided to the sliding units. A screw-cutting attachment is fitted.



Boring Machine, Horizontal

Stedall - Dowding Machine Tool Co., St. John St., Clerkenwell, E. C. England. (Vol.77, p.105E) 72.

This machine, built by Collet & Englehard, Offenbach-on-Main, Germany, has a 6¼ in. spindle; traverse at one setting, 59 in.; largest diameter bored, 55 in., largest diameter faced, 65 in., vertical traverse of saddle, 87 in.; horizontal traverse of upright, 130 in.; number of speeds, 10; number of feeds, 8, power required, 20 hp. Drive is by flanged motor on the saddle, and the movement may be set to stop automatically at any predetermined distance. Limit switches control milling operations, while the stop for the depth of bore is actuated mechanically. The bed may be readily extended and connected up to erect an additional upright for machining very large work.

Boring Machine, Horizontal, 6½-In. Spindle

Craven Bros., (Manchester), Ltd., Reddish, near Stockport, England. (Vol.77,p.140E.)

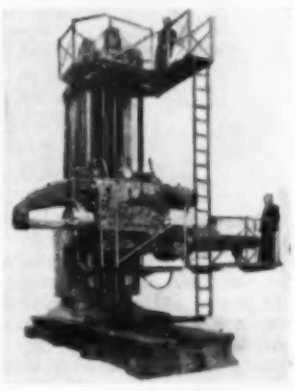
Forward adjustment of the spindle is 5 ft. 3 in., and the vertical and horizontal ranges are 7 ft. and 13 ft. 3 in. Controls are interlocked. Longitudinal traverse is given to the column by a widefaced rack and pinion. A 30 - hp. constant-speed motor actuates the vertical driving shaft, column power-motion shaft and saddle-elevating screw.

The spindle sleeve has a continuous-feed facing head with radial adjustment to the facing slide from a stationary handwheel. Six reversible automatic radial feeds are provided for the facing slide. Sixteen spindle speeds are 1.5 to 153 r.p.m. Spindle nose is bored No. 6 Morse taper.

Boring Machine, Horizontal, 8-In. Spindle

W. Asquith, Ltd., Halifax, England. (Vol.77,p.226E.) 116.

The approximate weight of this machine, with a bed to give 33 ft. traverse of the column, is 63 tons, and the total height is 23 ft. 6 in. It is capable of removing 400 lb. of metal per hr. Traverse of the slide up and down the column is 8 ft. Variable power milling feeds are available. The 27 spindle speeds range from 1 to 100 r.p.m. Milling can be carried out either upwards or downwards, while the column is traversed backwards or forwards. The spindle slide swivels

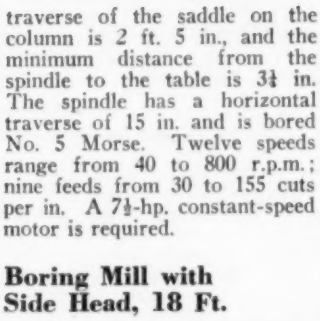


25 deg. above and below the horizontal. Spindle horizontal traverse is 5 ft. Nine milling feeds range from 1 to 12 in. per min., and the 36 drilling and boring feeds from 0.008 to 3 in. per min.

Boring Machine, Horizontal

G. Swift & Sons, Ltd., Halifax, England. (Vol.77,p.165E.)

Rapid power traverses are fitted to column and saddle and a friction reverse is incorporated for tapping. The traverse bed is 23 in. wide by 13 in. deep and the column has horizontal travel of 3 ft. 5 in. Vertical



traverse of the saddle on the column is 2 ft. 5 in., and the minimum distance from the spindle to the table is 3¼ in. The spindle has a horizontal traverse of 15 in. and is bored No. 5 Morse. Twelve speeds range from 40 to 800 r.p.m.; nine feeds from 30 to 155 cuts per in. A 7½-hp. constant-speed motor is required.

Boring Mill with Side Head, 18 Ft.

George Richards Co., Ltd., Broadheath, near Manchester, England. (Vol.77,p.36E.) 244.

Two heads on the crossrail and a side head are provided. The machine admits 8 ft. under the toolholders and 9 ft. under the crossrail. Tool bars have down feed of 5 ft. Side head has 30 in. vertical traverse and 27 in. horizontal traverse. Twelve feeds, horizontally and vertically, to the two vertical heads range from 1 to 0.03 in. per rev. Side head has four vertical feeds from 0.24 to 0.07

in. per rev., and four horizontal feeds from 0.12 to 0.36 in. per rev. Twelve speed changes to the table range from 10 to 0.8 r.p.m. Power rapid traverse is available to all heads. An unusual feature is that all heads are supplied with coolant by pumps.

Boring Machine, Jig, Vertical

Stedall-Dowding Machine Tool Co., St. John St., London, E.C., England. (Vol.77,p.137E.)

Built by Herbert Lindner, Berlin, this fine-boring machine has measuring tables and means for angular adjustment of the boring head in all directions. In conjunction with a swiveling or rotary table and by means of the semi-circular guide ways, operation on all sides of a work-

piece is possible. The longitudinal movement of the table is 31½ in., working surface, 39¾x19¾ in.; and the transverse adjustment of the boring spindle, 19¾ in. The drive to the spindle is hydraulically controlled, intermediate gearing giving a range of speeds from 40 to 3,000 r.p.m. The feed is hydraulically controlled up to 0.3 mm. The machine will drill 1½ in. from the solid; maximum boring diameter, 7¼ in.; maximum distance between the boring spindle and the top of the table, 23⅝ in.; maximum automatic movement of the boring spindle, 11 in.

Boring Machine, Precision, Horizontal

Hahn & Kolb, Stuttgart, Germany. (Vol.77,p.121E.) 81.

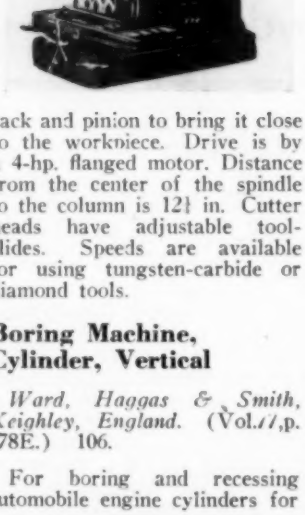
This Vomag horizontal precision-boring machine is built with one, two or three spindles. The boring and work headstocks are arranged opposite one another and reciprocating movements are hydraulically driven. Spindles speeds range from 300 to 3,600 r.p.m. Rates of slow

feed are varied by a rotary valve. Finished work can be automatically ejected and a new workpiece automatically clamped. Boring tools normally consist of a Widia and a diamond tool mounted one on each bar. The machine shown is for bores to 5½ in. and lengths up to 10 in.

Boring Machine, Cylinder, Vertical, Krause

Dowding & Doll, Ltd., Greycoat St., Westminster, S. W., England. (Vol.77,p.490E.) 199.

The Krause fine-boring machine has a maximum boring depth of 14½ in., the capacity ranging from ⅜ to 6¼ in. in diameter. The boring spindle is lapped and polished. A heavy bracket is adjustable vertically on the face of the column by



rack and pinion to bring it close to the workpiece. Drive is by a 4-hp. flanged motor. Distance from the center of the spindle to the column is 12½ in. Cutter heads have adjustable toolslides. Speeds are available for using tungsten-carbide or diamond tools.

Boring Machine, Cylinder, Vertical

Ward, Haggas & Smith, Keighley, England. (Vol.77,p. 178E.) 106.

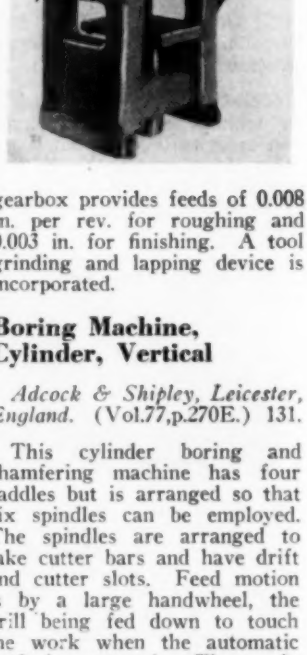
For boring and recessing automobile engine cylinders for

liners, and also for re-boring purposes, this machine has two heads of different sizes. The left head is adapted for bores from 2⅛ to 3½ in. while the right head is for bores from 3½ to 5 in. Center-to-center distance between the two spindles is 11½ in. The work table measures 36x24 in. and its vertical adjustment is 20 in. Vertical traverse of the small spindle is 12 in., large spindle, 15 in.

Boring Machine, Cylinder, Vertical

Catmur Machine Tool Corp., Ltd., 16 Caxton St., Westminster, S.W., England. (Vol.77, p.259E.) 126.

This "Arenco" fine boring machine uses single-point boring tools of tungsten-carbide and will deal with cylinders up to 4¾ in. in diameter by 11⅜ in. long. The table has a surface 21½x33 in. The whole boring head feeds down so that the cutter spindle has the same overhang at the start and finish. A

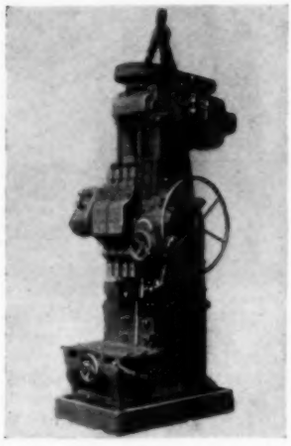


gearbox provides feeds of 0.008 in. per rev. for roughing and 0.003 in. for finishing. A tool grinding and lapping device is incorporated.

Boring Machine, Cylinder, Vertical

Adcock & Shipley, Leicester, England. (Vol.77,p.270E.) 131.

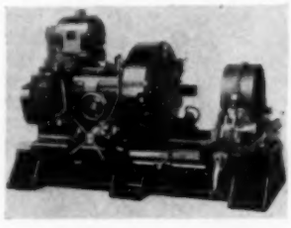
This cylinder boring and chamfering machine has four saddles but is arranged so that six spindles can be employed. The spindles are arranged to take cutter bars and have drift and cutter slots. Feed motion is by a large handwheel, the drill being fed down to touch the work when the automatic feed is engaged. The main drive is from a motor at the back, as shown, through V-belts to the main spindle and thence through spur and spiral gears to the cutter spindles. The fixture for rough location is set at a height to suit the conveyor system.



Boring and Grooving Machine, Tube

G. Swift & Sons, Ltd., Halifax, England. (Vol.77,p.269E.)

The machine performs at one setting the various machining operations required on bell-ended weldless steel tubes or steel tubes or pipes from 12 to 22 in. in diameter. The drive



is by 10-hp. motor. Four cutter-blocks are provided on the faceplate. Two are for removing surplus metal at the end of the pipe. At right angles is a long slide block carrying the boring and grooving cutter blocks.

Boring Machine, Tube, 48-In. Centers

Craven Brothers (Manchester), Ltd., Reddish, Stockport, England. (Vol.77,p.429E.) 175.

This single-ended finish-boring machine will bore tubes up to 60 in. outside diameter by 52 ft. 6 in. long with a 45 in. maximum diameter of bore. The main bed is built up of five lengths, making a total length of 140 ft. The upper bed has quick power drive along the main bed. The work-revolving headstock is mounted on the main bed towards the right-hand end. A combined bar support and end-facing tool-slide is placed at the extreme right-hand end of the main bed, the support being moved into a central position to

carry the bar when draw-boring and moved away when it is required to face the rear end of the tube. A facing toolrest is also provided.

Boring Machine, Horizontal, Drum

W. Asquith, Ltd., Halifax, England. (Vol.77,p.363E.) 163.

This electrically driven machine is for boring drums and tubes up to 45 ft. long. It weighs about 85 tons. Sliding beds, which carry the boring bar saddles and steadies, together with the feed-operating gear, are adjustable along the foundation bed. The driving headstock carries a hollow spindle to admit 24 in. in diam-

eter. Spindle is equipped with a 4-ft., 6-in. four-jaw chuck. Interchangeable serrated gripping pieces enable work from 6 in. to 3 ft. 8 in. in diameter to be accommodated. At the outer end of each sliding bed, a boring saddle holds bars from 7 to 10 in. in diameter and allows the bars to be laterally and vertically adjusted 1 in. on each side of the machine center line. Each boring saddle is traversed up to 20 ft. along the sliding bed.

Boring Machine, Duplex, Crankshaft and Camshaft Hole

J. Archdale & Co., Ltd., Birmingham, England. (Vol. 77,,p.636E.) 245.

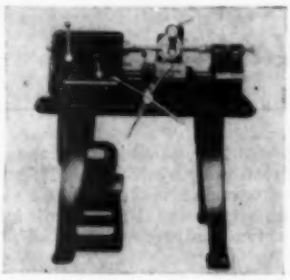
The hydraulically fed unit heads, each with a boring attachment, are mounted on a common bed. The spindles are at fixed centers to suit those of

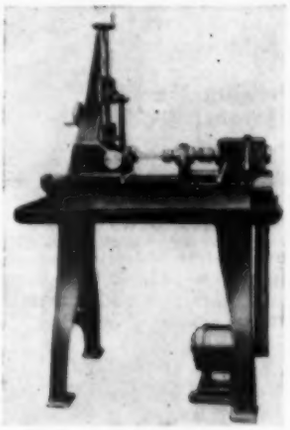
the crankshaft and camshaft bores, and if these centers should be altered it is only necessary to replace the multi-spindle attachments. Each unit is driven by a 7½ hp. motor and reduction gearing. Hydraulic feed is variable to 6 in. per min.

Boring Machine, Horizontal, Special-Purpose

Eugen Weisser & Co., Heilbrun o. Beckar, Germany. (Vol. 77,p.506E.) 205.

Two special-purpose horizontal boring machines were developed. One is intended for



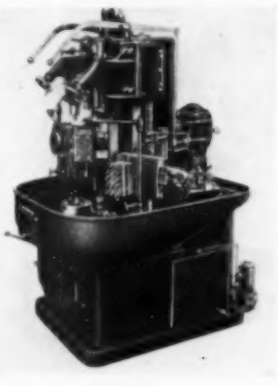


boring the gudgeon-pin holes in pistons, using tungsten-carbide cutters. Pistons up to 5½ in. diameter may be taken. Boring bars are balanced together with the drivers and may be used either overhanging or supported by the tailstock center. Spindle speed may be up to 2,000 r.p.m. and the two feed rates are 0.03 mm. and 0.06 mm. per rev. The angle plate shown in this machine can be removed and replaced by a vertical head for boring connecting-rod bearings and bearing bushings. The machine has capacity up to 18½ in. between centers, 3½ in. bore and 4 in. diameter.

Turning Machine, Vertical, Semi-Automatic

Stedall-Dowding Machine Tool Co., St. John St., Clerkenwell, E.C., England. (Vol.77, p.333E.) 157.

Two workpieces are machined simultaneously either between centers or in chucks. The vertical work-spindles are driven from a motor built in the machine base, and the seven spindle speeds range from 47.5 to 375 r.p.m. There is one longitudinal



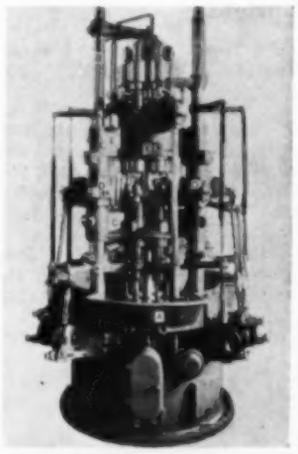
turning slide moving up and down on the front ways of a central column, and two face-turning side heads adjustable along lateral column ways, each of the heads having a cross-slide. Each side head has independent hydraulic drive and automatic control. Side heads may also be used to perform longitudinal turning operations. The vertical movement for the length turning slide and the movement for the cross-slide are hydraulically operated. The machine will swing 11 in. in diameter, turn 7½ in. between carriages; the distance between centers, 17¾ in.; feed of length-tool carriages, 9⅛ in.; length feed of the cross-slides, 9¾ in.; cross-feed, 4 in.; hole through work-spindles, 1⅜ in.

Turning Machine, Vertical, Six-Spindle

E. H. Jones (Machine Tools), Ltd., Baldwin Terrace, Islington, N., England. (Vol.77,p. 300E.) 147.

This six-spindle automatic for bar or chucking work is made by the Tavannes Watch Co., Tavannes, Switzerland. The tools operate from below and on the side of the bars so that the chips are easily disposed of. No feed collets are required, and this allows a larger bar capacity in relation to spindle and drum diameters. A total of 12 or 18 independent tools can be employed.

The central tool carrier is vertically adjustable. The side tooling arrangements consist of three double-sided tool heads, one being mounted on each pil-



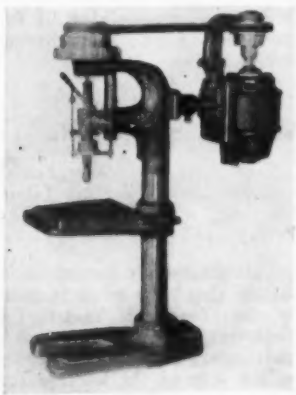
lar. Each head consists of two V-guides and cross-slides which move close to the work to avoid overhang of tools. All slides can be equipped with a compound slide and three slides with swivel movements. The smallest machine has bar capacity of 1 in. or 1¼ in., and the chucking capacity is 4 in., turning length 4 in., feeding length, 11 in., when the largest machine has per capacity of 1⅜ in. a chucking capacity of 5½ in., turning length of 6 in., and feeding length of 14 in.

Drilling Machines

Drilling Machine, Sensitive, Bench

Jones & Shipman, Ltd., Leicester, England. (Vol.77,p. 284E.) 134.

In the motor-driven type the armature shaft carries a three-step pulley. A depth stop with fine adjustment is provided. Belt-drive machines have coun-

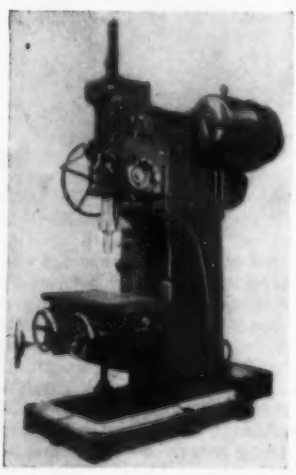


tershafts with cone pulleys for either three or six speeds. The spindle is bored No. 1 Morse taper. Distance from the spindle center to the column is 6¾ in., and the feed is 4 in. Distance from the spindle nose to the base is 18 in.

Drilling Machine, Upright

F. Town & Sons, Halifax, England. (Vol.77,p.506E.) 206. 206.

This 32-in. heavy-duty vertical drilling machine and twist-drill testing machine will drill holes up to 2 in. in diameter in steel and test drills ranging from ¼ to 2 in. in diameter. Work 2 ft. 4 in. deep can be admitted between the spindle and top of the table.

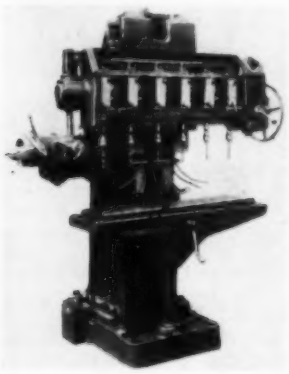


The table working surface is 30 in. long by 18 in. wide, and its traverse is 24 in., and the cross traverse, 10 in., while the vertical adjustment is 15 in. The 90 speeds range from 48 to 600 r.p.m., and the fifteen gear-driven feeds range from 40 to 375 cuts per in. Net weight, 4½ tons.

Drilling Machine, Upright, Six-Spindle

W. Asquith, Ltd., Halifax, England. (Vol.77,p.331E.) 154.

This machine is set up for drilling simultaneously six straight-line holes in cast-iron pipes up to 13 in. outside diameter. Minimum and maximum center-to-center distances of

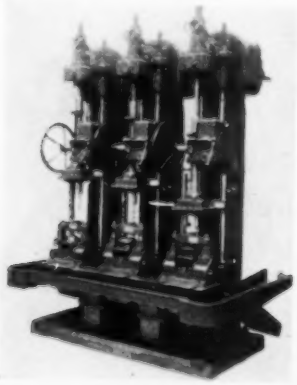


adjacent spindles are 2¼ in. and 8 in., respectively, while the maximum distance between the two outer spindles is 3 ft. 5 in. The balanced drilling head has a vertical traverse of 6 in. on the column. Working surface is 48x12 in., and the table vertical adjustment is 21 in.

Drilling Machines, Upright, Gang, 21- and 28-In.

J. Archdale & Co., Ltd., Birmingham, England. (Vol. 77,p.109E.) 77.

These machines are produced in two forms; that is,

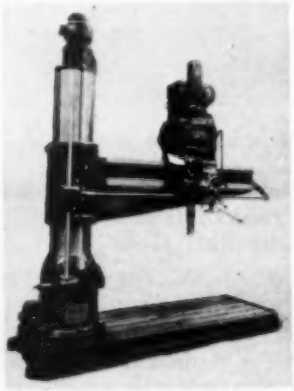


for mounting multiple-spindle attachments and gang drills. Distance from the spindle to the table is variable. Two machined facings at the front of the column carry the driving head, the spindle head and the adjustable table, and are satisfactory for mounting bushplate brackets. The driving head may be single or two-speed. Spindle is bored to carry multiple-spindle attachments, is mounted in a flanged sleeve and is arranged with a driving slot for the attachment. The 21-in. machine drills up to 1¼ in. in mild steel, and the table top is 20x18 in. The 28-in. machine drills up to 3 in. and the table top measures 26 to 24 in.

Drilling Machine, Radial, 7-Ft.

Kitchen & Wade, Ltd., Halifax, England. (Vol.77,p.74E.) 59.

This high-production, motorized, centralized-control, radial drilling, boring and tapping machine is made in five standard sizes of 6 to 10 ft. radius. The 7 ft. size will drill holes from the solid in cast iron up to 3½ in. in diam-



eter and in mild steel up to 3 in. diameter, tap 2 in. Whitworth, and bore up to 12 in. Vertical power adjustment of the arm is 3 ft. 3 in. The saddle is equipped with ball bearings throughout and the spindle is bored No. 5 Morse taper. Eighteen spindle speeds range from 580 to 27 r.p.m., and the length of feed is 18 in.

Drilling Machine, Radial, 13-Ft.

W. Asquith, Ltd., Halifax, England. (Vol.77,p.124E.) 85.

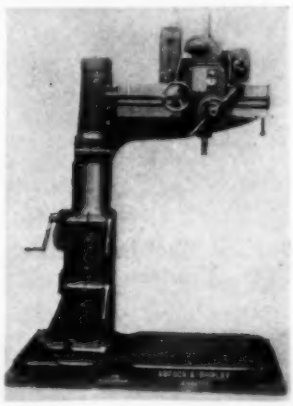
This all-electric radial drilling, boring, tapping and studding machine will drill 3-in. holes in mild steel, the maximum and minimum radii being 13 ft. and 3 ft. The machine weighs 20 tons. It admits 8 ft. 6 in. from the spindle to the baseplate, and horizontal traverse along the arm is 9 ft. 10 in. The firm's automatic speed selector enables the speed for the class

of material to be quickly applied. Eighteen spindle speeds range 1,030 to 20 r.p.m. Vertical traverse of the spindle is 1 ft. 4 in. Nine rates of self-acting feed motion are provided, varying from 120 to 11 cuts per in.

Drilling Machine, Radial, 3-Ft.

Adcock & Shipley, Leicester, England. (Vol.77,p.299E.) 145.

In this radial drilling and tapping machine the column is raised and lowered by rack and pinion motion. The saddle is mounted on ball bearings. The drill spindle runs in a ball-bearing steel quill with the feed rack cut integral. Four spindle speeds are obtained electrically, the number being doubled by back-gears. Reverse motion for tapping is obtained electrically. The spindle is bored No. 2 on No. 3 Morse Taper and the



traverse by hand is 9 in., by power 5 in. Travel of the saddle on the slide is 26 in., while the vertical adjustment of the arm is 12 in. Maximum and minimum distances between the spindle nose and the base are 47 and 35 in.

Drilling Machine, Radial, 5-Ft.

G. Swift & Sons, Ltd., Halifax, England. (Vol.77,p.459E.) 185.

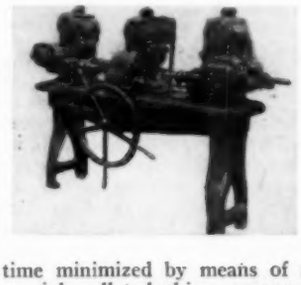
Work 5 ft. deep can be admitted between the spindle nose and the baseplate. The machine will drill up to 3 in. in mild steel, and tap up to 2 in. in cast iron and 1½ in. in mild steel. Each section of the triple baseplate has a work-

ing surface of 5 ft. x 3 ft. 3 in. x 9 in. deep. Arm is elevated and lowered 2 ft. 2 in. by a 3-hp. motor. Saddle is mounted on ball bearings. Eighteen reversible spindle speeds range from 25 to 1,000 r.p.m. Nine rates of speed are 30 to 155 cuts per in. Drive is by a 5-hp. vertical reversing motor.

Drilling Machines, Horizontal, Deep-Hole

Jones & Shipman, Ltd., Leicester, England. (Vol.76,p. 541E.) 2.

This machine will take a workpiece 8 in. long and drill up to ⅝-in. holes. Independent motor drive to double workhead in the center of the machine. Loading



time minimized by means of a special collet locking arrangement. The two left-hand spindles drill to an adjustable length and the two spindles on the right finish the hole after the return of the left-hand spindles.

Drilling Machine, Horizontal, Deep-Hole, Three-Spindle

Craven Bros. (Manchester), Ltd., Reddish, near Stockport, England. (Vol.77,p.651E.) 247.

Three holes are drilled simultaneously in camshafts on this machine. Holes up to 5 ft. long by 1 in. in diameter can be drilled. Both work and tool are

revolved. Height of centers, 6 in.; three spreads, 100, 160 and 250 r.p.m and cutting speeds double these; feeds, 37 to 304 cuts per in., or double these with the drill and the three-jaw chucks rotating. The spindles in both headstocks are mounted in dual-purpose ball journals.

Drilling Machine, Horizontal, Slot

Wm. Asquith, Ltd., Halifax, England. (Vol.76,p.543E.) 4.

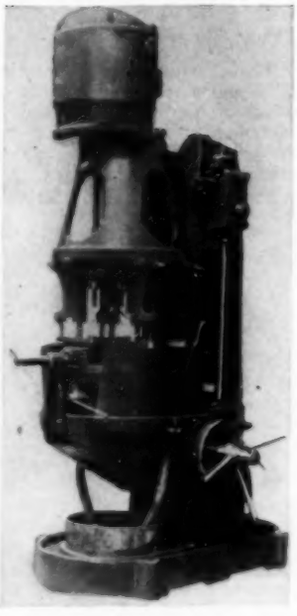
The maximum size of slot machined is ⅝ in. wide by 3 in. long, the minimum ⅞ by 1 in., through diameters up to 1¼ in. Two opposed heads carry drilling and milling spindles. The worktable has a surface of 12x 6 in., and the rate of traverse is

1 in. per min. The drive is by fast and loose pulleys.

Drilling Machine, Special, for Screw-Die Clearance Holes

Adcock & Shipley, Leicester, England. (Vol. 77,p.93E.) 69.

This special production machine drills clearance holes in round, square and hexagon dies for screws. It will take circular dies up to 4 in. outside diameter, hexagons from ½ to 1½ in. Whitworth, and squares

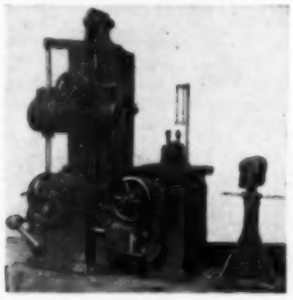


up to 3½ in. outside. The four spindles are adjustable in all directions to suit the dies being drilled. The drill guide brackets are arranged for interchanging drill bushes as required. A circular indexing table carries a jig to suit the dies. There are five stations, one for loading and unloading.

Drilling and Facing Machine, Pipe-Flange

Ward, Haggas & Smith, Keighley, England. (Vol.77, p.332E.) 155.

Pipe flanges from 3 to 12 in. in diameter can be turned and faced on this machine which is also arranged for drilling bolt holes up to 1½ in. in diameter



and arboring or spot-facing for the nuts. The box-section bed carries the column while an auxiliary bed carries the worktable with a surface of 20x18 in. The column is adjustable along the bed by hand for a distance of 16 in. The saddle is vertically adjustable a distance of 20 in.

Drilling Machine, Four-Spindle, Piston

Adcock & Shipley, Leicester, England. (Vol.77,p.349E.) 162.

This special machine is for drilling the wrist-pin holes through bosses in Ford pistons. It averages four pistons per min. The column ways are at an angle corresponding to the

holes to be drilled. The machine head is one of the firm's units, motor-driven. The cam form is arranged to give a quick approach through jig and bushings to the work with slow cutting feed and fast-return action. Coupled to this head is a four-spindle head running in slideways and with spring-pressure guide bars.

Drilling Machine, Two-Way

Adcock & Shipley, Leicester, England. (Vol.77,p.392E.) 170.

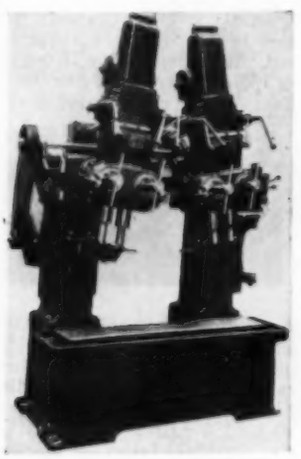
The machine drills rear spring brackets. Setting is by handwheel for the vertical head and by removable crank handle for the horizontal head. Each drive head is of the firm's unit type with cam feed. An inverted U-shape box casting allows the

horizontal head to pass under the vertical head when at work. Production, 80 brackets per hr.

Drilling and Reaming Machines, Front-Axle

Kitchen & Wade, Ltd., Halifax, England. (Vol.77,p.444E.)

This four-spindle, front-axle drilling, reaming and spot-facing machine was built for the front axles of the 8-hp. Ford motor car built at the Dagenham Works, England. The holes dealt with range

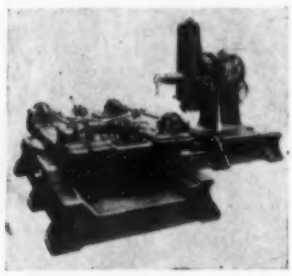


from ¾ to ⅞ in. in diameter. Uprights bear a cross-slide on which are mounted the two independent drilling and reaming heads, each fitted with duplex spindles. The inclined head on the left is fixed and the other has a horizontal movement on the cross-slide. Each spindle has two speeds, one for drilling and the other for reaming and spot-facing.

Drilling Machine, Locomotive-Wheel

W. Asquith, Ltd., Halifax, England. (Vol.77,p.587E.) 229.

Drilling, tapping and countersinking operations can be performed on locomotive wheels ranging from 3 to 7 ft. in diameter and for wheels of 3 ft. 3 in. gage. To the main bed is tongued and bolted another bed at right angles, measuring



8 ft. 6 in. long by 5 ft. wide. A box-section standard carries the gearbox and spindle, and has power feed both forward and reverse, the latter being used for drilling angular holes from the inside. The head is extended in height to enable the spindle to reach the center of the wheel. The slide swivels 180 deg. Worktable transverse, traverse is 3 ft. 7 in. Wheels are rotated by ratchet lever and rollers.

Drilling Machine Crankshaft, Duplex

Craven Bros. (Manchester), Ltd., Reddish, near Stockport, England. (Vol.77,p.619E.) 237.

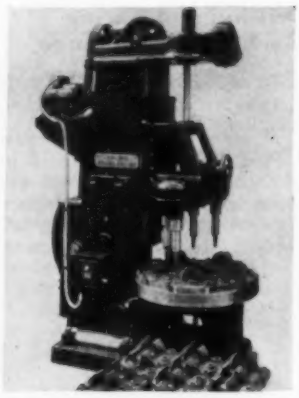
Height of centers is 8¼ in. and a 10¼-in. three-jaw concentric chuck is fitted to each spindle. Each worktable has feed in one direction along the bed, the range being from 40 to 150 cuts per in. in four steps. Two stays are provided for

supporting the crankshaft. Drill support brackets are provided on each bed, and two others can be bolted to the saddles. Six spindle speeds range from 30 to 150 r.p.m. Each half of the machine forms a separate unit.

Reaming Machine, Four-Spindle

Kitchen & Wade, Ltd., Halifax, England. (Vol.77,p.212E.)

This four - spindle machine reams taper holes in railway chairs; 95 lb. crossing chairs with four holes being reamed

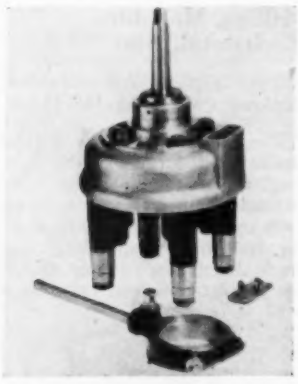


at the rate of 57 chairs per hr. The worktable is 3 ft. 4 in. in diameter. The reaming head is cam-operated and has a vertical traverse of 9 in.

Drillheads, Improved

Hey Engineering Co., Ltd., 11 Queen's Road, Coventry, England. (Vol.77,p.259E.) 125.

Positive control of adjustment to keep the spindles square and



in alignment is now fitted on all heads. Automatic lubrication is provided from a central oil supply. Drill spindles have concentric guides at the top and bottom, and drill thrust is taken by a ground steel plate. Spindles run in plain bearings at speeds up to 4,000 r.p.m. for using tungsten-carbide tipped drills. Heads are available in two-, three-, four-, six- and eight-spindle types.

Gear Cutting and Finishing Machines

Generating Machines, Gear Bevel

Benrath Machine Tools, John Dalton St., Manchester, England. (Vol.77,p.136E.) 88.

Heidenreich & Harbeck, Hamburg, Germany, are building two bevel generators. The smaller cuts up to 8 in. by 5D.P. and will also deal with spiral-bevel gears. The spiral tooth form is created by off-setting the tool-slides eccentrically to the setting arbor of the machine. The 30-in. machine is for cutting large pitches in two operations, namely gashing out

and finish-machining by generation. The two tools work simultaneously. According to the pitch the gashing operation may be performed by two methods. The tools may cut straight slots for every tooth, that is, with parallel sides, or they may leave wedge-shaped spaces. For both roughing and finishing motions are automatic.

Hobbing Machine, Reinecker, 157-In.

Stedall - Dowding Machine Tool Co., St. John St., Clerkenwell, London, E. C., England. (Vol. 77,p.391E.) 169.

The machine has a rotating table and a traveling column on which is carried the hob saddle. Hobbing spiral gears for reduction gearing can be undertaken, also spur gears and wormwheels. Specifications:

Maximum diameter of gear blank handled, 157 in.; maximum diametral pitch, 1½; vertical travel of hob carriage, 91½ in.; maximum width of spur gear, 88½ in.; maximum width of spiral gear, 86½ in.; maximum diameter of spiral gear with 45-deg. lead angle, 157 in.; maximum size of hob, 9⅞ in. in diameter by 14½ in. long; minimum distance between hob and work arbor, 5½ in.; net weight, 117,000 lb.

Rack-Cutting Machines, Automatic

J. Holroyd & Co., Ltd., Milnrow, Lancashire, England. (Vol.77,p.589E.) 231.

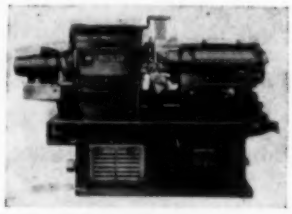
Cutting toothed racks up to 30 in. long by 4 in. face can be done with single or gang milling cutters mounted on the horizontal spindle. Pitches from

⅛ to 1½ in. can be cut, the necessary indexing motion being varied by slip gears in the bed. Maximum diameter of cutters taken is 4 in.

Hobbing Machine, Spur and Spline-Shaft

Dowding & Doll, Ltd., Greycoat St., Westminster, S. W., England. (Vol.77,p.474E.) 194.

This Pfauter gear hobber is particularly intended for work with small numbers of teeth, including spurs, spline shafts and worms, the hobbing of the last being limited to those of high helix angle. Maximum hobbing length is 19¾ in.; maximum diameter hobbed, 10⅝ in.; number of teeth cut between 4 and 100, and maximum pitch, 2½

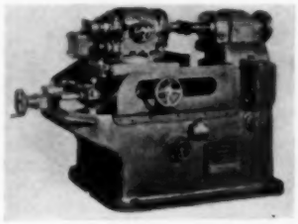


D.P. The hob speeds range from 44 to 127 r.p.m. Index change gears enable the hob and the work to rotate positively in correct relation, the indexing being automatically effected. The table is fed horizontally, the hobbing head being stationary.

Lapping Machine, Gear

Biernatzki & Co., Chemnitz, Germany. (Vol.77,p.194E.) 111.

The lapping process is automatic and the time required can be adjusted from 2 to 30 min. The machine will lap spur, helical and double-helical gears up to a pitch diameter of 14 in., and a ratio of 1 to 1. One fixed and one movable head are provided. One head can be

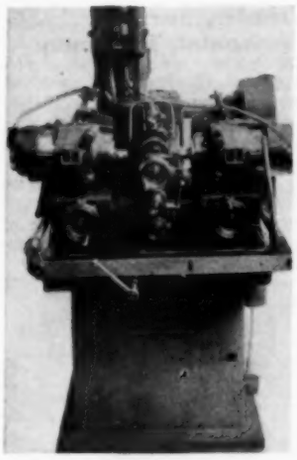


swivelled to lap bevel gears. One of the lapping spindles receives an operating motion so that the gears are continuously displaced and reapproached to an adjustable templet.

Chamfering Machines, Gear-Tooth

Adcock & Shipley, Leicester, England. (Vol.77,p.314E.) 149.

This machine will deal with spur and single- and double-helical gears. Production is one tooth per second per cutter head. There are two cutter heads, each with a built-in motor, and mandrels or collets



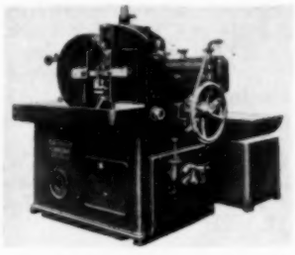
may be used for holding purposes. Adjustment to suit the gears is provided by a tilting motion of the cutter heads. Saddles are adjustable horizontally and feed motion to the cutter heads is obtained by a reciprocating cam motion to the slides.

Grinding Machines

Grinder, Centerless, No. 7

Burton, Griffiths & Co., Ltd., Sparkbrook, Birmingham, England. (Vol.77,p.454E.) 100.

B.S.A. Tools, Ltd., Birmingham, have introduced a No. 7 centerless grinder which will take work between ☆ and 3 in. in diameter, the maximum capacity for bar grinding being 1¾ x 10 ft. Limits of 0.0002 in. are produced. The grinding



wheel is 18 in. in diameter by 4 in. face, and the control wheel 9 in. by 4 in. face. For shoulders and tapered work done singly, a hand lever is used, whereas a micrometer handwheel sets the head for straight - through parallel work of predetermined diameter. The diamond holder will turn 180 deg.

Grinder, Cylindrical, Hydraulic

Churchill Machine Tool Co., Ltd., Broadheath, near Manchester, England. (Vol.77,p. 11E.)

The workhead has a self-contained motor drive, the speeds being infinitely variable in the ratio of 6 to 1, thus obtaining a greater measure of usefulness from the wide range of traverse speeds. The four sizes built are 6x20, 6x36, 10x20 and 10x36 in. All motions are obtained from a constant-speed motor mounted on the bed to drive a backshaft by V-belts. Multiple V-belt drive is used for the grinding wheel spindle which is of Nitralloy steel. The upper table swivels for taper grinding. The hydraulic mechanism gives an infinite range of speeds from 6 to 240 in. per min. Automatic feed can be varied from 0.00025 in. to 0.002 in. on the work diameter per table stroke.

Grinder, Cylindrical, 30 x 96 In.

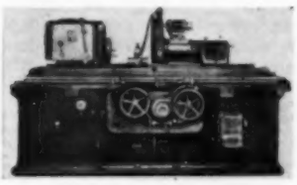
Craven Brothers (Manchester), Ltd., Reddish, near Stockport, England. (Vol.77,p.555E.) 221.

The machine will grind work up to 30 in. in diameter by 96 in. long. Table drive is obtained from a flanged motor at the right-hand end of the bed, driving through a rack-and-pinion device, with backlash eliminated. The inclined table can swivel 3½ deg. at each side of the parallel position. The work-rotating head, the work supports and the tailstock are carried on the inclined face of the table, the workhead and the tailstock being adjustable longitudinally by rack and spiral pinion. Eight rates of travel range from 20 to 130 in. per min. Automatic feed to the grinding head is by ratchet and pawl, automatically operated on the table reversal.

Grinder, Cylindrical, 10¼-In.

J. Kamenicek & Co., Prague, Czecho-Slovakia. (Vol.77,p. 210E.) 112.

These machines swing 10¼ in. and take 24, 39½ or 59 in. between centers. The standard machine is a plain grinder with dead centers but a universal headstock may be fitted. The compound table can be swivelled for grinding tapers. Work headstock speeds range from 25 to 230 r.p.m. in six steps. Standard wheel is 24 in. in diameter by 2 in. wide. Wheel

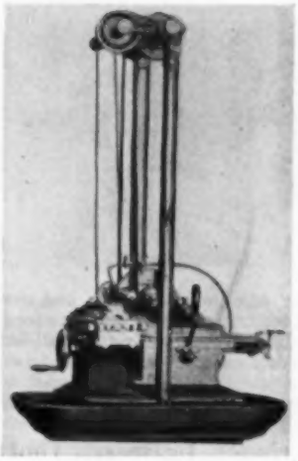


drive is by 10-hp. motor. Hydraulic speeds of the table range from 0.0001 in. to 0.003 in. Automatic in-feed for plunge cut grinding can be provided. An internal grinding attachment is provided.

Grinder, Cylindrical, Precision

G. H. Alexander Machinery, Ltd., Coleshill St., Birmingham, England. (Vol.77,p.258E.) 124.

Loewe-Gesfurel A.G., Berlin, are the makers of this precision cylindrical grinder for work of small diameter in the watch, instrument and optical trades. The center height is 50 mm. or 2 in. Work up to 1⅞ in. in diameter can be admitted. The maximum length ground is 7⅛ in., while the maximum weight of the workpiece is 4½ lb. Accuracy to within 0.00004 in. is claimed. The table is moved by hand and the upper portion swivels up to 10 deg. Three



work speeds range from 254 to 930 r.p.m. and the wheel speed is 4,200 r.p.m.

Grinder, Roll

Craven Bros. (Manchester), Ltd., Reddish, near Stockport, England. (Vol.77,p.285E.) 137.

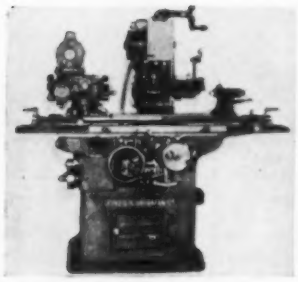
Designed for finishing sheet and tinplate rolls, the machine may be employed for grinding new rolls or resurfacing used rolls, and if the chamfer grinding rest is fitted a roll may be completely finished at one setting. The saddle automatically reverses its traverse and the operator can devote the whole of his attention to the actual grinding operation. With a 26-in.

wheel, the machine will grind rolls from 4½ to 34 in. in diameter, the maximum length admitted being 11 ft. 6 in., on a bed 22 ft. long. The grinding head has a traverse slide with fine and coarse hand adjustment for the grinding-wheel feed. For the cambering motion a cam is driven from the rack fixed to the bed through a four-change gearbox.

Grinder, Universal, All-Electric

Jones & Shipman, Ltd., Leicester, England. (Vol.77,p. 89E.) 64.

Universal tool, cutter and internal grinders of the all-electric type, are built in two sizes to swing, 10 in. x 18 in. long and 10 in. x 24 in. Worktable traverse at 33 to 144 in. per min. is obtained from a four-speed, all-steel gearbox and self-contained motor drive. The table swivels to an included angle of 14 deg. The wheelhead has a self-contained motor drive for external and internal grinding, with vertical micrometer adjustment and graduated swivel movement. Vertical traverse of

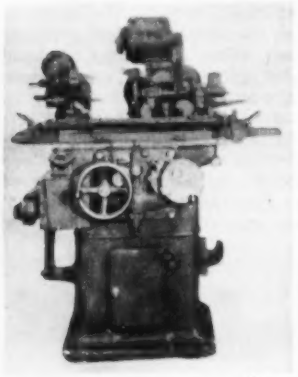


the wheelhead is 6½ in. and the cross traverse, 6 in. Cross feed is by hand or power to 0.0001 in. Workhead speeds range from 112 to 383 r.p.m. The head is arranged for dead center work.

Grinder, Universal, Tool

Jones & Shipman, Ltd., Leicester, England. (Vol.77,p. 165E.) 103.

Grinder will swing 8 in. by 18 in. long and is intended for general toolroom and general-purpose precision grinding. A grinding wheel may be fixed at either end of the spindle with

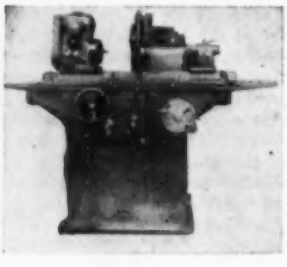


an internal grinding spindle arranged at the back and swung completely around to bring it into operation. The workhead has four speeds from 100 to 500 r.p.m. Cross traverse of the wheelhead is 6 in. and its vertical movement, 4 in.

Grinder, Universal

Selson Machine Tool Co., Ltd., Abbey House, Victoria St., Westminster, S. W., England. (Vol.77,p.472E.) 191.

This 6x20 - in. universal grinder is built by J. Kamenicek & Co., Prague-Vinohrady, Czecho-Slovakia. It swings 10 in. in diameter over the table and 6½ in. in diameter over the splash guards. The



six work speeds range 38 to 380 r.p.m., and the table traverse is infinitely variable between 1 ft. and 20 ft. per min. The table is of the compound type for taper grinding. It is possible to stop the table traverse while the wheel feed operates, thus obtaining plunge cuts. The wheel-slide carries a 4-hp. motor. Internal grinding attachments can be supplied for holes up to 5 in. deep.

Grinder, Internal, 12-In.

Churchill Machine Tool Co., Ltd., Broadheath, near Manchester, England. (Vol.77,p. 378E.) 166.

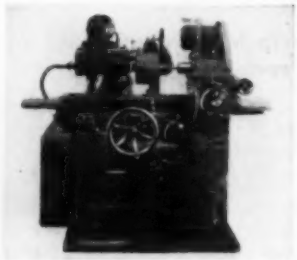
Swing capacity is 12 in., and maximum distance from the face-plate to the bridge slide is 24 in. The machine is arranged both for internal and face grinding, the facing spindle being shown raised clear. Table

traverse is effected by a double-acting piston, the speed range being from 6 to 480 in. per min. The workhead swivels for taper grinding and the workhead spindle is bored ¾ in. to accommodate the collet or chuck - operating mechanism. Operating conveniences adapt the machine to quantity production.

Grinder, Internal

A. A. Jones & Shipman, Ltd., Leicester, England. (Vol.77, p.650E.) 246.

This quantity production machine has a swing over the table of 13¾ in., the table traverse being 18 in. Four work speeds and four rates of table traverse



are provided. Wheel speed is 18,000 r.p.m. Adjustable stops on the table automatically stop the workhead for gaging purposes. Feed per ratchet tooth is 0.0001 in. on the diameter. A diamond wheel-truing device is fitted. Three table stops control over-running and traverse length. Floor space, 72 x 36 in.

Grinder, Surface, Horizontal, Toolroom

Alfred Herbert, Ltd., Coventry, England. (Vol.77,p.572E.)

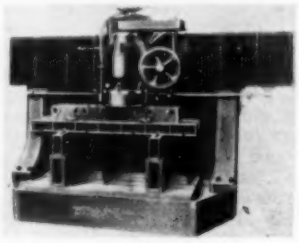
The Lumsden Machine Tool Co., Ltd., is building two toolroom surface grinders, one with power feeds and the other hand controlled. Working surface of the first is 24x7 in.; cross travel

and down feed, 9 in. The hand machine has working surface of 15x9 in. and both motions are 9 in. A flange motor drives the wheel spindle direct at 2,800 r.p.m.

Grinder, Surface, Cylinder-Block

Mayer & Schmidt, A. G., Offenbach - on - Main, Germany. (Vol.77,p.120E.) 79.

This machine is shown set up for grinding cylinder blocks and covers clamped to a system of slotted beams and blocks which are secured on the baseplate. The grinder consists of a baseplate with two side standards



bolted to it and carrying a cross-rail serving as the horizontal guide way for the wheelhead. The cup wheel is 12 in. in diameter. The largest height between the clamping surface and the grinding wheel is 24 in.; vertical adjustment of the wheelhead, 6 in. Wet grinding attachments can be supplied.

Grinder, Surface, Rotary, 20-In.

John Lund, Ltd., Cross Hills, near Keighley, England. (Vol. 77,p.260E.) 127.

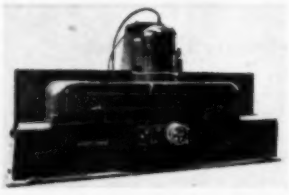
This machine will grind the face of a ring 20 in. in diameter by 6 in. thick. An hydraulically operated wheelhead traverse gives speeds from 0 to 10 ft. per min. and quick approach to the working position, together with a quick re-

ceding motion. A simple adjustment provides for grinding 10 deg. concave or 15 deg. convex. The grinding wheel is coupled direct to a 12-hp. motor giving three spindle speeds. The table feed can be either hand or automatic through a hydraulic unit and gives a range of feeds from 0.00025 in. to 0.00125 in.

Grinder, Surface, Vertical-Spindle

John Lund, Ltd., Cross Hills, near Keighley, England. (Vol. 77,p.379E.) 168.

The machine is for grinding work 18 in. wide by 18 in. high by 72 in. long. Electrical and hydraulic controls are centralized. Table traverse is hydraulically actuated. The grinding spindle with segmen-

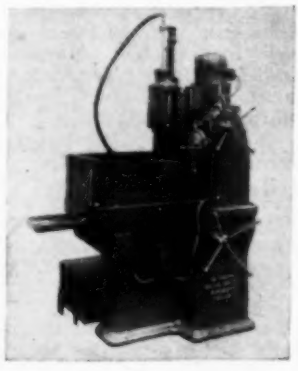


tal wheel is driven by a 40-hp. stator and rotor unit, mounted integrally with the grinding head. Table drive gives any speed from 1 to 35 ft. per min. If desired, an hydraulic down feed to the wheel can be fitted, giving feeds between 0.00025 in. and 0.004 in. The floor space, 18 ft. x 6 ft.; weight, 10 tons.

Grinder, Surface, Vertical-Spindle

Churchill Machine Tool Co., Ltd., Broadheath, near Manchester, England.. (Vol.77,p. 531E.) 217.

This is the smallest surface grinder manufactured by the firm and carries an 18-in. magnetic chuck rotated beneath a



9-in. cup-type wheel. It is driven by two motors, one of 5 hp. for the wheel spindle, and one of 2 hp. for the rotary table. The wheelhead has vertical adjustment in long guides attached to the cross-rail. A dead-stop facilitates sizing with the micrometer feed. The automatic electrical control is so arranged that when the table is traversed from beneath the grinding wheel for loading purposes or inspection, the rotation of the chuck is automatically arrested and the coolant cut off.

Grinders, Axle-Journal

Churchill Machine Tool Co., Ltd., Broadheath, near Manchester, England. (Vol.77, p.29E.) 36.

Regrinding the inside journals of locomotive axles with the wheels mounted in position can be done. The journals may be ground simultaneously or independently, each wheelhead having separate cross adjustment. A grinder is available

to deal with outside journals also. The machine for inside journals will swing 90 in. on centers, and the maximum diameter journal ground is 10 in. x 14 in. long. Both the workhead and the tailstock may be adjusted longitudinally. The work is carried on dead centers. Straight truing or radiusing of the edges of the grinding wheels can be carried out with an attachment.

Grinder, Crankshaft and Valve

Harvey Frost & Co., Ltd., 148 Great Portland St., London, W., England. (Vol.76,p.635E.)

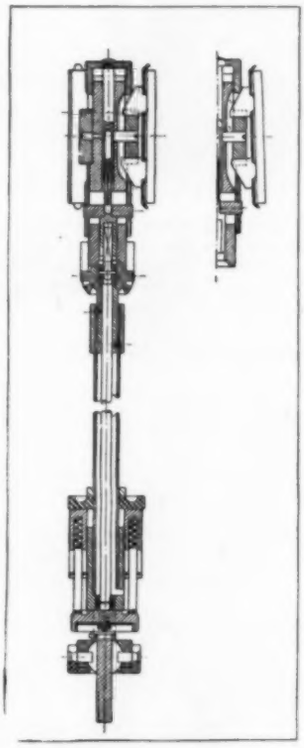
This machine is built by A. S. M. Seest Jernstoberi & Maskinfabric, Aarhus, Denmark. It is designed for regrinding worn pins and journals of automobile crankshafts. The crankshaft rotates by two pins or bearings on two V-supports which are open so the shaft can be dropped in. A cup wheel on a spindle at

right angles operates on the part to be ground. As the distance between the wheel and the support face is fixed according to the wheel feed put on, any ovality on the pin or bearing is reduced quickly to cylindrical form. The machine takes shafts of four, six and eight-throw engines.

Grinder, Cylinder, "H. F. Robot"

Harvey Frost & Co., Ltd., 150 Great Portland St., London, W., England. (Vol.77,p.284E.)

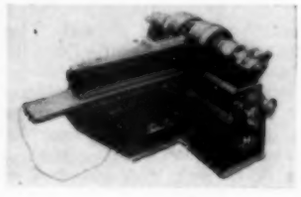
This hone type grinder for reconditioning automobile cylinders covers a range of diameters from 2½ to 4 15/16 in. Cutting stones are arranged to float in the bore whether tapered or parallel.



Grinder, Card-Flat

J. Hetherington & Sons, Ltd., Manchester, England. (Vol.77, p.10E.) 29.

Card flats for textile machinery are finished on the edges. These flats are roughly of T-section and the machine grinds the edges of the base of each to a definite width. It consists of a bed carrying a reciprocating table and two grinding heads. The flats are



1¾ in. wide by 40 in. long and are mounted in pairs. Two passes are needed to complete the work, the machine then stopping automatically.

Grinder, Cutter

Ward, Haggas & Smith, Keighley, England. (Vol.76, p.665E.) 26.

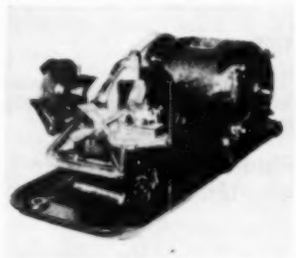
This electrically driven portable attachment grinds cutters in position on rotary planing or end-milling machines. The base, 22 in. long by 12½ in. wide,

bolts into T-slots of the machine table and carries a slide inclined to 20 deg. which is the rake required. The column is adjusted 3 in. horizontally. The balanced grinding head is given reciprocating motion up to 6 in.

Grinder, Drill, Bench

Jones & Shipman, Leicester, England. (Vol.77,p.109E.)

This drill grinder has capacity from 1 to 10 mm. and will take drills down to 0.010 in. The drill is held in a holder and the drill point is centralized by a

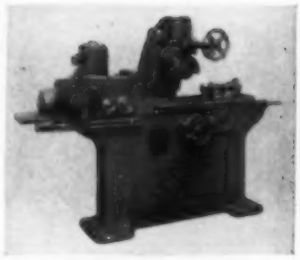


gage line. The lip is produced with a roll by the compound motion of the carrying frame, and the amount of clearance can be varied.

Grinder, Hob, Automatic

J. Holroyd & Co., Ltd., Milnrow, near Rochdale, England. (Vol.77,p.166E.) 104.

The machine takes hobs 8 in. in diameter between centers and admits 24 in. in length. The minimum and maximum leads ground are 50 and 1,000 in. The wheelhead has vertical and cross adjustments and swivel adjustment to suit the lead angle of the hob. Spiral motion to the work is obtained from the leadscrew and then through



change wheels carried on the front of the head to the spindle differential motion. The dividing motion operates automatically at the end of the return stroke. Maximum and minimum gashes indexed are 40 and 2, respectively.

Grinder, Leadscrew, Lindner

Stedall - Dowding Machine Tool Co., St. John St., London, E. C., England.. (Vol.77,p. 167E.) 90.

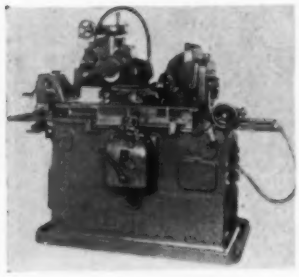
Herbert Lindner, Berlin, built this thread grinder for finishing long leadscrews and other threads, the maximum distance between centers and the maximum grinding length being 27½ in. Minimum diameter ground is ½ in., maximum diameter, 7¾ in., or when using a 250 mm. wheel, 11¾ in. Mini-

mum pitch is 40 threads per in. Whitworth, the maximum being 4 per in. Acme-type threads can be ground up to 2 per in. Tapers up to 1 in. 10 can be ground. The workhead has hydraulic drive, the speeds being between 4 and 70 r.p.m. An internal grinding attachment will take a maximum diameter of 11¾ in. in the chuck; the maximum diameter ground 9¾ in., the minimum 1 3/16 in.

Grinder, Spline-Shaft, Hydraulic

A. C. Wickman, Ltd., Coventry, England. (Vol.77,p.155E.)

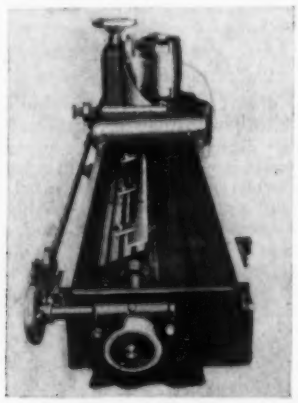
This Orcutt grinder is made by the Gear Grinding Co., Ltd., Birmingham, and it works on the formed-wheel system. All surfaces of a single spline can be ground at each pass of the wheel. Maximum distance between centers is 20 in., although this can be increased to 36 in. The work spindle has a 3-in. hole and a long shaft can be held in taper collets. The wheel is 8 in. in diameter by 1½ in. thick. Drive for the main table and work is hydraulic.



Grinder, Shear-Blade

Gustav Göckel, G.m.b.H., Darmstadt, Germany. (Vol.77, 539E.) 214.

In this grinder the blade-clamping block is submerged in a bath. The cup wheel is mounted on a rolling carriage. A small propeller inside of the cup wheel throws



coolant on the shear blade. The machine works automatically except for the wheel feed which may be varied from 0.005 mm. to 0.025 mm. The cup wheel can swivel 15 deg. each way. The machine takes blades up to 20 ft. long.

Honing Machine, Reamer, Loewe

G. H. Alexander Machinery Co., Ltd., Coleshill St., Birmingham, England. (Vol.77, p.297E.) 142.

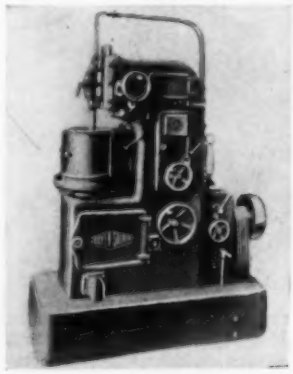
Straight and spiral reamers can be honed on this machine which will take tapers up to 1 in 12 in. The height of centers is 2¾ in. and the distance between centers is 18¾ in. The machine will hone a length of 9½ in. The table top swivels

15 deg. and bears two tailstocks. Setting of the table top is facilitated by end-measuring gages. The honing spindle swivels together with its motor. During the honing process the reamer tooth is guided on a tongue clamped in a holder.

Grinder, Splineway, Internal

Craven Bros. (Manchester), Ltd., Reddish, near Stockport, England. (Vol.77,p.298E.) 143.

This Craven-Saurer internal spline grinder has a grinding wheel driven by a water turbine. Full length and depth of a splineway are ground at each stroke of the wheel. The downward stroke of the grinding head rectifies one splineway, and the head is then given a horizontal movement that brings the wheel into position when an upward stroke occurs to grind



the opposite splineway, after which the table indexes to the next position. Stroke, horizontal movement and indexing movement are automatic. The vertical stroke is variable from 4 to 7 in. the cross stroke from 0 to 1 1/16 in., the smallest bore 1 1/16 in., and the largest 4¾ in.

Grinder, Tool, Hydraulic, Reinecker

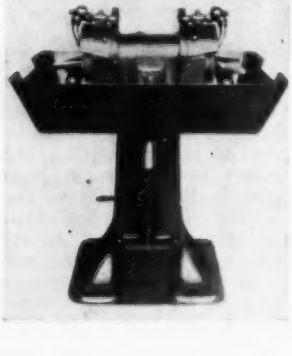
Stedall - Dowding Machine Tool Co., St. John St., Clerkenwell, E. C., England. (Vol.77, p.416E.) 172.

The description of this machine will be found in the American Section, p. 42.

Grinder, Tool, Tungsten-Carbide

Cromwell Engineering Co. (Coventry), Ltd., Foleshill Road, Coventry, England. (Vol. 77,p.314E.) 151.

Two cup wheels are used. A motor is built with the armature direct on the grinding wheel spindle. The two sides



are for roughing and finishing respectively. Graduated work rests are provided.

Grinder, Saw

S. Russell & Sons, Ltd., Leicester, England. (Vol.77,p. 60E.) 53.

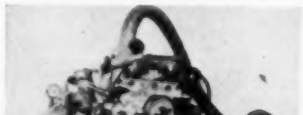
This machine grinds inserted-tooth circular saw blades of 15 to 40 in. in diameter and ¼ to 2 in. pitch. Setting over

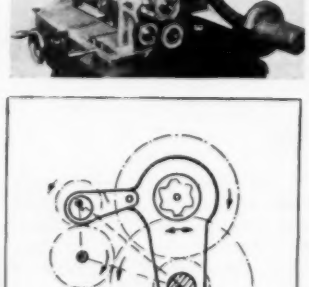
the grinding wheel for bevelling the sides of the roughing teeth is a feature. The machine will work with or without dividing templets.

Grinder, Tap-Relieving

G. H. Alexander Machinery, Ltd., Coleshill St., Birmingham, England. (Vol.77,p.223E.) 115.

This apparatus is made by Loewe & Co., Berlin. It has a combined crank and gear drive, and is suitable for bolting to a work bench. Taps up to 3 in., having 2, 3, 4, 6 and



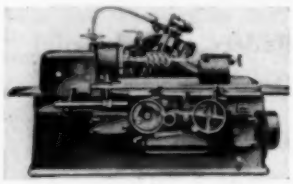


8 grooves can be ground. The greatest length that can be mounted on centers is 10 in. With an extra attachment taps for stay bolts and girder stays up to 4 ft. 3 in. long can be ground. The relieving apparatus can be used on tool grinders.

Grinder, Worm, Reinecker

Stedall-Dowding Machine Tool Co., St. John St., Clerkenwell, E. C., England. (Vol.76, p.557E.) F 8.

The machine grinds hardened worms up to 25 module, right or left hand, single or multiple start, up to 12 in. diameter and 15¾ in. length of thread. The work is carried between centers and is given the necessary rotary and axial movement which

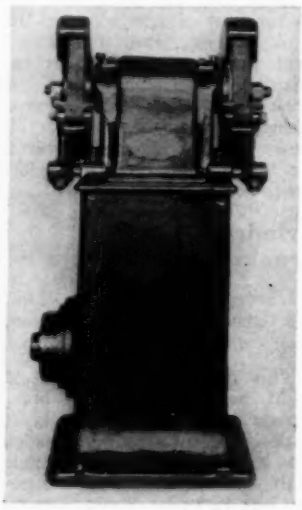


feeds it past the grinding wheel set at the correct angle. The wheel operates in the space of the thread and may be dressed to grind one or both flanks simultaneously. Hydraulic motion of the wheelhead is furnished. Automatic control is fitted.

Grinder, Floor-Stand

T. S. Harrison & Sons, Ltd., Heckmondwike, England. (Vol. 77,p.61E.) 55.

This machine is made in three sizes with wheels 10x1 in., 12x1½ in., and 14x2 in. The motor is of a totally inclosed



flange-mounting type, clamped against a machined face. Both starter and push-button control are available.

Grinder, Lathe

S. Wolf & Co., Ltd., 115, Southwark St., London, S. E., England. (Vol.77,p.572E.) 226.

For external or internal grinding on lathes of 6 to 8 in. height of centers, the attachment has the spindle mounted in four ball bearings. It uses a 3x½-in. wheel at 9,000 r.p.m for

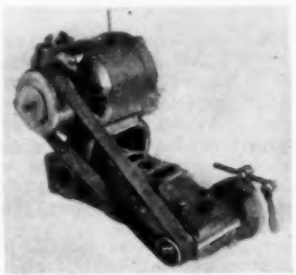
external grinding, and a 1x¼-in. wheel running at 23,000 r.p.m. for internal work.

The attachment can be bolted or clamped to the lathe.

Grinding Spindles

New Fortuna Machine Co., Ltd., Southmead, Bristol, England. (Vol.77,p.141E.) 95.

The new range of grinding spindles covers attachments suitable for external and internal grinding. Spindles of various lengths and capacities can be

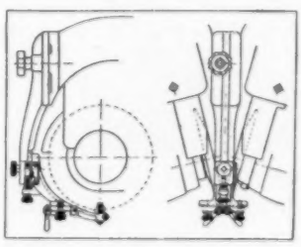


supplied, interchangeable with the attachments, which use the same type of main body casting for either belt or motor-driven models. Attachments can be used either right or left hand.

Forming Attachment, Grinding-Wheel, Maag

Sulzer Bros. (London), Ltd., 31 Bedford Square, London, W.C., England. (Vol.77,p. 139E.) 92.

The attachment enables a radius to be formed on the outside diameters of the two grinding wheels. The round-edged wheel is required to form a radius at

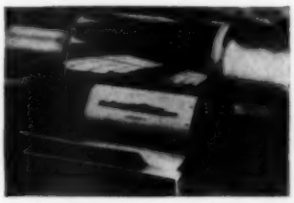


the bottom of the gear teeth, according to the specifications for machine-cut gears published in 1932 by the British Standards Institution. The device is fitted to the front of the machine in place of the standard attachment. A separate carrier with diamond is provided for each wheel. The radius on the wheel is produced by swiveling the holder by means of the handle (bottom).

Grinding Process, Mirror-Finish

Craven Bros. (Manchester), Ltd., Reddish, Stockport, England. (Vol.77,p.525E.) 212.

The company has applied for patent on a process and apparatus to produce an optically true surface on rolls for nonferrous metals. The finish is termed "Standard" mirror finish.



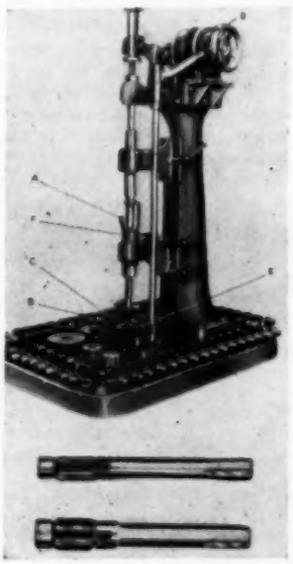
If the material is without flaw prior to polishing the surface produced by the process will be optically true.

Honing and Lapping Machines

Honing Machine, Internal-Spline

G. H. Alexander Machinery, Ltd., Coleshill St., Birmingham, England. (Vol.77,p.331E.) 153.

Made by the Sunbeam Motor Car Co., Ltd., Wolverhampton, this machine is used for honing internal splines and hardened components of engines, gears and other parts. At the upper end of the column is a mechan-



ism for producing the reciprocating and oscillating motions required. At the lower end the spindle carries the hone, and the special hone-locking device. The table carries a fixture suited to the work to be undertaken, and has indexing mechanism.

Honing Machine, Vertical

Selson Machine Tool Co., Ltd., Abbey House, Victoria St., London, S.W., England. (Vol. 77,p.28E.) 34.

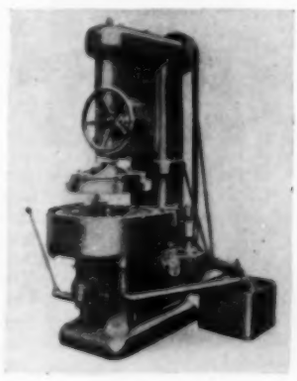
Made by Boneham & Turner, Ltd., Mansfield, this Wadkin-Boneham honing machine is driven by a constant-speed motor and three-speed gearbox, or by belt drive. The stroke of the hone is variable up to 10¼ in.

the number of reciprocations by power being 30, 50, and 70 per min. Spindle speeds available are 160 to 240 r.p.m. The head has a rise and fall of 18 in. on the column. Distance from the center of the spindle to the column is 14½ in.; table surface, 21x47 in.

Lapping and Honing Machines, Vertical

B. S. A. Tools, Ltd., Birmingham, England. (Vol.76,p. 613E.) 14.

Two machines take care of lapping and external honing. Both deal with cylindrical or flat work without adjustment, given an approximate workholder. Work plates to suit the pieces to be dealt with are used. The amount of oscillation of the lapping or abrasive plates can be adjusted. Vertical lift of 6 in. for the abrasive head enables



the work to be changed readily. By means of an indicator the head can be brought onto the work at predetermined pressure, thus facilitating duplication of size. The top plate holder can float to obtain alignment with the bottom plate. Laps and abrasive rings are 24 in. in diameter by 6 in. face.

Lapping Machine, Vertical, Hydraulic

Hahn & Kolb, Stuttgart, Germany. (Vol.77,p.121E.) 80.

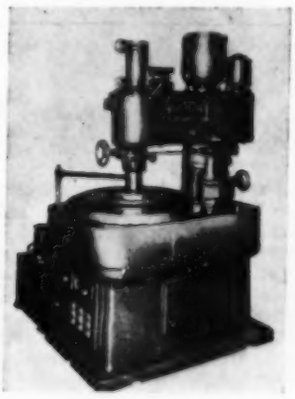
This universal hydraulic lapping machine has laps made of cast iron or bonded carborundum. The upper disk runs in a sleeve which is vertically adjustable within the overarm which may be swung aside. By

means of an oil cylinder the upper disk may be pressed against the lower disk with viariable pressure. An eccentric shaft supported in the hollow spindle of the lower disk produces eccentric movement of the workholder.

Lapping Machine, Vertical, Universal, Hydraulic-Feed

Leo C. Steinle, Ltd., Marsham St., Westminster S. W., England. (Vol.77,p.492E.) 203.

This Hahn & Kolb universal lapping machine has two laps mounted on vertical spindles that run in opposite directions. The upper lap runs in a sleeve with vertical adjustment. This sleeve is guided by the arm which may be swung clear of the



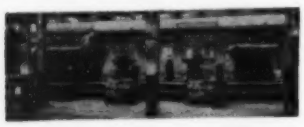
workholder. By means of a cylinder on the horizontal arm, the pressure between the two lapping plates may be varied. Cylindrical as well as flat parts may be lapped and abrasive as well as cast-iron laps can be used. The work-holder plate is given an eccentric motion between the plates.

Lathes

Lathe, Engine, Heavy-Duty

Froriep, Rheydt, Germany. (Vol.76,p.632E.) 16.

Rotors and shafts weighing up to 150 metric tons are machined on this all-electric lathe which has the following specifications: weight, 220 metric tons, height of centers, 70¾ in., distance between centers, 394 in., width of bed, 141¾ in., length of bed, 708 in. The bed has

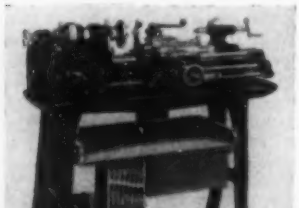


two tool carriages moving on the two front ways, and the steadyrests and tailstock are mounted on the two rear ways. A 60-kw. d.c. motor drives the main spindle and in addition 11 small motors drive the auxiliary equipment. Spindle speeds range from 0.5 to 80 r.p.m. Power longitudinal and cross-feed motions are derived from the main spindle drive in 16 feed rates.

Lathe, Engine, Small

B. Elliott & Co., Ltd., York Rd., London, N., England. (Vol. 76,p.575E.) 10.

Two Leinen lathes are built with 3 1/16 in., and 5¼ in., height of centers, each with a bed 40 in. long. The spindle is bored ½ in., and the maximum diameter admitted through the collet is ¼ in. On the 5¼ in. lathe,

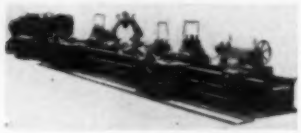


the spindle is bored ⅝ in., taking 19 in. between centers. The headstock is back-geared and is driven by a belt from a flange motor below. The compound slide-rest provides longitudinal, cross and taper turning, and both a leadscrew and a feed-shaft are fitted, the latter having automatic saddle release.

Lathe, Engine, Heavy-Duty, 16-In.

Craven Bros., (Manchester), Ltd., Reddish, Stockport, England. (Col.77,p.211E.) 113.

The machine swings 23 in. over the saddle, the faceplate being 32 in. in diameter and the spindle speeds ranging from 3 to 177 r.p.m. Eight sliding feeds range from 1/64 to ⅛ in., and eight surfacing feeds from ⅛ to 0.007 in. Drive is by 50-hp. motor. The two saddles are provided with front and back rests. The front rest on each

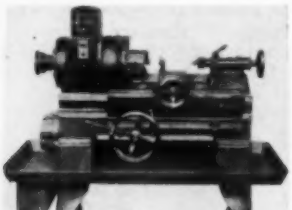


saddle has a swivelling compound slide. The leadscrew provides for cutting English and metric threads. If required, arrangements can be made for taper turning. With a bed 32 ft. long the weight of the machine is 20½ tons.

Lathe, Engine, High-Speed, 6-In.

Charles Churchill & Co., Ltd., Birmingham, England. (Vol.77, p.260E.) 128.

This "Smallpiece" high-speed lathe swings 12 in. over the bed and 6 in. over the cross-slide by 15 in. between centers. It has a motorized headstock and with 50-cycle supply gives three spindle speeds in two alternative ranges; that is, the speed range may be 750, 1,000 and 1,500 r.p.m. or 750, 1,500 and 3,000 r.p.m. The front saddle

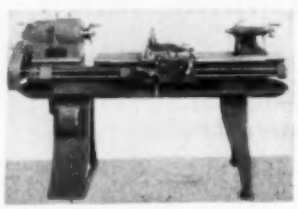


is of exceptional length and provides support when turning and facing with newer cutting materials. The cross-slide may be either fixed or swiveling and operated by hand or power. The three standard feeds are 0.004 in., 0.006 in., and 0.008 in. per rev. Tailstock has ball-bearing spindle.

Lathe, All-Geared, Precision

Colchester Lathe Co., Hythe, Colchester, England. (Vol.77, p.348E.) 160.

This 6-in. center "Master" lathe with all-geared head will swing 9 in. over the saddle by 3 ft. 2 in. between centers, and when the halfgap piece is removed the gap will take work 18 in. in diameter by 4½ in. wide in front of the faceplate. A ¾-hp. reversing motor is used for electrical drive when required. Spindle speeds range

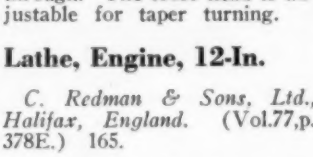


from 20 to 550 r.p.m. The spindle is bored 1¼ in. right through. The loose head is adjustable for taper turning.

Lathe, Engine, 12-In.

C. Redman & Sons, Ltd., Halifax, England. (Vol.77,p. 378E.) 165.

This lathe is adaped for turning non-ferrous bars up to 10 ft. long. The drive is by a 35-hp. motor and two-speed gearbox, and then direct to the headstock spindle by means of multiple Texropes. Gears have

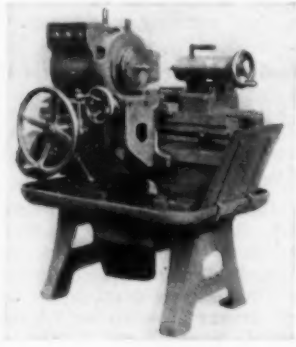


teeth of the double helical form. The saddle apron and a dropping worm provide the power sliding feeds. Quick power traverse is obtained by a coarse-pitch screw. Net weight, 9 tons.

Lathe, Production, Multi-Tool

B. S. A. Tools, Ltd., Birmingham, England. (Vol.77,p.619 E.) 238.

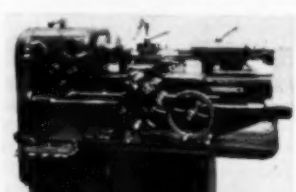
This 6x12 in. machine has a self-contained motorized headstock. The spindle carries the rotor and is mounted on Timken bearings. Flange diameter is 7 in., and spigot diameter, 5¾ in. Control is by push buttons at the front. Rotor and stator units can be supplied for minimum speed of 500 r.p.m. and maximum speed of 3,000 r.p.m. Eight feeds range from 0.003 to 0.03 in. Maximum travel on the front cross-slide is 3¼ in., the rear slide, 3 in. Working stroke of the saddle is 6 in. Using tools of the single-point type, the machine operates automatically after insertion of the workpiece and engagement of the feed. The front tools enable multi diameters to be obtained and the rear cross-slide on fixed saddle carries surfacing, grooving and forming tools.



Lathe, Form-Cutting, Experimental

J. Holroyd & Co., Ltd., Milnrow, near Rochdale, England. (Vol.77,p.91E.) 66.

The company's well-known test piece lathe has been redesigned so that aluminum and similar specimens may be produced. As before, the shape required is obtained by means of scroll formers. The lathe is of 6 in. height of centers, to admit 12 in. between centers, the

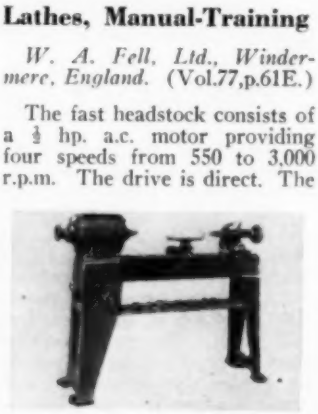


six spindle speeds ranging from 110 to 1,000 r.p.m., and the four feeds from 1/32 to 1/128 in. Feed change gearing is housed inside the headstock. The loose headstock has a revolving center which is built into the barrel. The saddle can be moved along the bed by hand or power, the slides consisting of the ordinary cross-slide carrying a triangular steel turret and also a slide which works in conjunction with the forming device. An attachment enables the lathe to cut its own scrolls.

Lathes, Manual-Training

W. A. Fell, Ltd., Windermere, England. (Vol.77,p.61E.)

The fast headstock consists of a ½ hp. a.c. motor providing four speeds from 550 to 3,000 r.p.m. The drive is direct. The



lathe will swing 12 in. diameter by 30 in. between centers. The spindle is threaded at both ends so that large work can be turned at the left-hand end. A hand turning rest is provided.

Lathe, Turret, High-Speed, 24-In.

J. Lang & Sons, Ltd., Johnstone, England. (Vol.76,p.649 E.) 19.

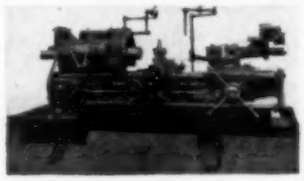
The machine was developed to use the newest cutting alloys. In the 24-in. unit the cutting speeds available range from 350 to 400 ft. per min. on 0.4 carbon steel and up to 1,500 per min. on gunmetal. Eight feeds are obtained in a range from 12 to 288 cuts per in. Nickel-chrome,

heat-treated steel gears are used and all teeth profiles are ground. The cross-slide carries a hexagonal turret having hardened and ground steel bushings for the locating holes. Engagement and disengagement of the automatic sliding and surfacing feeds are controlled by a single lever. If desired automatic stops for these notions are fitted, and a quick power traverse for moving the saddle can be had.

Lathe, Turret, Combination

Alfred Herbert, Ltd., Coventry, England. (Vol.77,p.227E.)

This combination turret lathe swings 15½ in. over the bed and 8 in. over the cross-slide, the maximum distance from the spindle flange to the turret face being 40 in. The bed is finished by grinding and way covers are fitted. Eight spindles speeds range from 45 to 766 r.p.m.



Four automatic feeds are provided to the saddle and the turret, the range being from 40 to 160 cuts per in. The hole through the spindle is 2 1/16 in. Each face of the hexagon turret measures 7x4½ in. while the tool holes are 2½ in. Length dimensions within fine limits can be obtained by means of an indicator on the pilot wheel shaft. A chasing attachment can be added. Six self-selecting stops for the turret slide are carried on a hexagon stop bar in front.

Lathe, Turret, Combination, No. 13

H. W. Ward & Co., Ltd., Selly Oak, Birmingham, England. (Vol.77,p.241E.) 120.

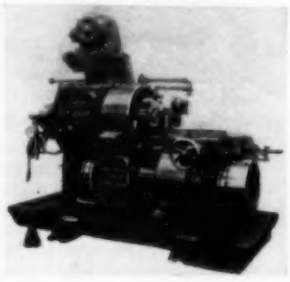
This machine has a ball and roller bearing headstock and a complete system of automatic lubrication. Swing over the bed is 28 in. in diameter, over the steel cross-slide, 18¾ in. in diameter, length admitted between the spindle nose and the turret face, 98 in. The spindle

has 16 speeds in each direction, the range for normal work being from 7 to 225 r.p.m., and for high-speed work from 14 to 450 r.p.m. Length of the automatic feeds is 81 in., the number of feeds to the saddles and cross-slides being 48, with a range from 5 to 656 cuts per in. The intermediate saddle has sliding, surfacing and screw-cutting motions, all reversible.

Lathe, Turret, "Auto Junior"

Alfred Herbert, Ltd., Coventry, England. (Vol.77,p.347E.)

This lathe is intended for using tungsten-carbide tools and has six slow spindle speeds and six fast speeds, the range being from 120 to 1,484 r.p.m. Maximum swing over the overhead support is 8 in., and over the cross-slides, using the full stroke, 4½ in. Maximum distance

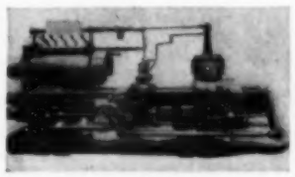


from the spindle flange to the turret face is 15 9/16 in., and the working stroke of the capstan is 5½ in., and the maximum stroke of the cross-slide, 2¾ in. The machine has a roller bearing spindle and drive is by a 5 hp. motor and Texropes. The turret slide is actuated by a drum cam through a roller carried on an extension of the slide.

Lathe, Turret, Combination, No. 8

H. W. Ward & Co., Ltd., Selly Oak, Birmingham, England. (Vol.77,p.540E.) 216.

The No. 8 combination turret lathe has 10¾ in. centers. swings 19½ in. over the bed covers or

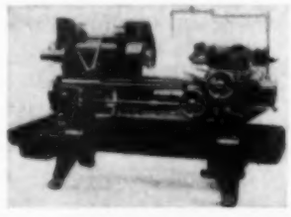


12½ in. over the cross-slide Saddle has longitudinal automatic feed 43 in. long and will chase 30¾ in., the length of the automatic feed to the turret being 43 in., while 58 in. is admitted between the spindle nose and the turret face. The single pulley drive gives 16 speeds in each direction from 15 to 600 r.p.m. for normal work, or 20 to 800 r.p.m. for high-speed work. The spindle is bored 3¾ in., the flange being 10 in. in diameter. The intermediate saddle has automatic sliding, surfacing and screw-cutting motions, and 10 reversible automatic feeds, longitudinal and cross, range from 12 to 270 cuts per inch.

Lathe, Turret, Cross-Sliding

Alfred Herbert, Ltd., Coventry, England. (Vol.77,p.570E.)

This No. 5 turret lathe for chuck work has a hexagon turret with both longitudinal and transverse feeds. It is intended for small-lot production on turning, facing and boring operations. Maximum swing over the bed covers is 15½ in.; distance from spindle flange to tur-



ret face 31 in.; transverse feed of the turret from the spindle center, 7¾ in.; eight spindle speeds in each direction from 30 to 511 r.p.m.; four automatic feeds to turret in both directions, 40 to 160 cuts per in.; spindle hole 2 1/16 in. A chasing or a taper turning attachment can be fitted.

Saddle for Turret Lathe, Hand-Operated

Alfred Herbert, Ltd., Coventry, England. (Vol.77,p.108E.)

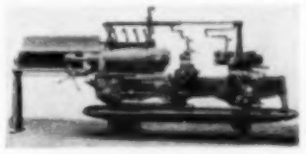
This hand-operated traversing saddle will be supplied on special order for the company's

No. 5 hexagon turret lathe. The saddle carries a square turret and a toolholder on the back of the steel cross-slide, enabling turning, facing, necking, forming and chamfering to be done. This combination gives an increased number of tool stations and two tools can be cutting at the same time.

Lathe Bar, 2½-In.

H. W. Ward & Co., Ltd., Selly Oak, Birmingham, England. (Vol.77,p.179E.) 107.

The No. 7B machine has a hand sliding intermediate saddle, ball and roller bearing headstock, automatic lubrication and a bar chuck which may be supplied either for hand or air-operation and takes bars up to 2½ in. in diameter. Turning tra-

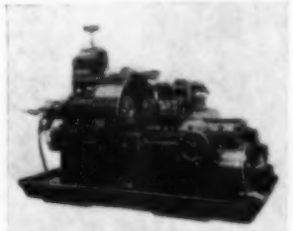


verse is 34 in. Spindle speeds to 1,000 r.p.m. are obtained by sliding gears. Six stops are fitted for the longitudinal motions and four for the cross-slide motions. The turret saddle has ten rates of automatic feed and quick traverse in both directions.

Lathe, Automatic, Heavy-Duty, No. 4

Alfred Herbert, Ltd., Coventry, England. (Vol.77,p.556E.) 222.

This auto-lathe has a maximum swing of 16½ in., with a maximum swing over the cross-slides using full stroke of 9 in., while the working stroke of the turret slide is 10 in. The machine is designed to take full advantage of the new cutting materials. Speed range is from 24 to 490 r.p.m. The main spindle is bored 3 in. The



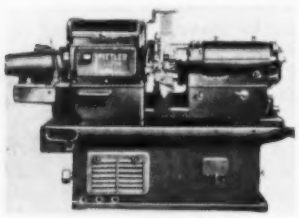
spindle can be stopped automatically either for withdrawing a tool or at the end of the cycle and it starts automatically in time for the next tool. A five-face turret can be supplied, but the standard form has four faces. The tool holes are 2½ in. in diameter. Cross-slides are independently adjustable 6½ in. along the bed and can work either simultaneously or separately. The maximum stroke is

4½ in.; the minimum, 1 in. Two T-slots on each cross-slide enable a double-sided steel toolpost to be held. The 24 feeds range from 12 to 253 cuts per in.

Screw Machine, Automatic, Pittler

Dowding & Doll, Ltd., Greycoat St., Westminster, S.W., England. (Vol.77,p.475E.) 195.

The chief modifications of this Pittler automatic are a box bed and an all-geared headstock. The standard machine has five holes in the turret. The all-geared headstock gives a range of 56 spindle speeds. The bar-feed mechanism permits the use of black stock of varying diam-

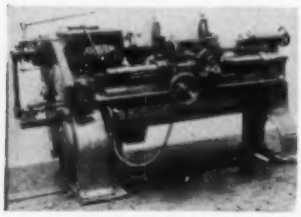


eter. Feed for the tools is obtained by a universally adjustable sectional cam which causes a friction roller to move automatically between two disks. The resetting of the various feeds is facilitated by a graduated index showing the respective positions of the friction roller. Maximum bar admitted is 1⅛ in. in diameter; longitudinal traverse of the turret head, 4 in.; shortest distance from chuck to turret, 5½ in.; threading capacity, ¾ in., holes in turret, 1⅛ in.; power required, 7 hp.

Lathe, Axleshaft

Craven Bros. (Manchester), Ltd., Reddish, England. (Vol. 77,p.75E.) 61.

This 6-in. high-speed lathe is arranged for machining the long taper portions of motor-car axleshafts, the lathe admitting 3 ft. between centers. The shaft is held in a three-jaw concentric chuck and is supported



at the other end on a revolving poppet center. Two swing-over-roller steadyrests may be adjusted longitudinally to support the shaft on previously ground paths. Three equally-spaced tools are mounted in sliding holders on the top rest, each being traversed one-third the length and being set to meet the cut of the preceding tool. Production, 20 axleshafts per hr. Six spindle speeds are given.

Lathes, Crankshaft

Craven Bros. (Manchester), Ltd., Reddish, near Stockport, England. (Vol.77,p.634E.) 241.

One machine turns the crankpins and the other the end and center bearings of six-throw cranks at one setting and the four intermediate bearings at a second setting. Each machine is driven by 10-hp. motor and

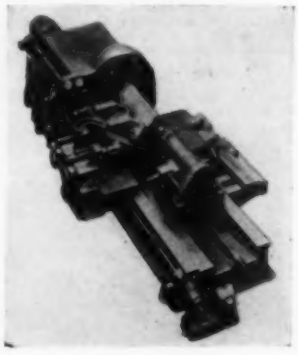
has three spindle speeds, namely, 35, 46 and 65 r.p.m. Center height of the pin machine is 10½ in. and it will admit 36 in. between headstocks. These have power-driven revolving spindles carried in roller bearings. Driving brackets grip the end journals. The right-hand headstock can be moved along the bed by power. The slides have feeds for facing the webs and forming the pins, using a vertical form tool at the front and a broad blade at the back.

The journal-turning machine is of the center-drive type. The center height is 9 in. and the length admitted 3 ft. Front saddles carry turret-type toolslides and receive detachable toolblocks. Saddles have longitudinal and transverse feed motion with automatic trip action. The two rear toolslides are independent of the front slides.

Lathe, Ingot-Turning

Craven Bros. (Manchester), Ltd., Reddish, near Stockport, England. (Vol.76,p.664E.) 24.

Taper or parallel ingots, with straight, concave or convex sides, may be machined. The lathe will deal with squares from 8¾ to 21 in. side, the maximum length taken, 6 ft. 8 in. The main drive is through eight gear changes from a constant-speed motor. The faceplate has gripping jaws for holding the square headers of ingots. The saddle carries two transverse rocking toolslides, actuated by heavy cam motions which give the rectangular form to the ingot. Tapers are produced by a copying bar at the rear.



Turning and Polishing Machine, Pulley

Ward, Haggas & Smith, Keighley, England. (Vol.76,p. 612E.) 13.

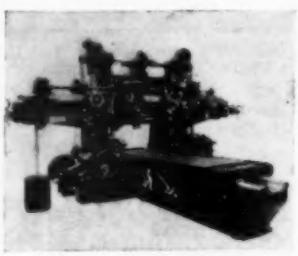
Turning and grinding pulleys up to 30 in. in diameter and polishing on another mandrel can be done. Work 28 in. wide is admitted between centers. Two sets of turning slides, fitted with square turrets, are carried on cross-slides at the front and the rear. Three self-acting feeds are provided. The toolslides swivel for grooving rope pulleys or for turning large diameter bevel gears. The range of cutting speeds is 4.1 to 41 r.p.m. A former plate is carried on the cross-slide to actuate the bottom slide through a roller.

Milling Machines

Milling Machine, Planer-Type

Kendall & Gent, Ltd., Manchester, England. (Vol.77,p. 523E.) 209.

Two vertical and two horizontal swiveling spindles are provided. A profiling motion is also provided to the left-hand vertical saddle. The table is 3 ft. 6 in. wide over-all by 10 ft. long and height under the cutters is 2 ft. 9 in. Traversing motion to the table is by hand or by variable power feed, and rapid power motion is afforded. Vertical heads on the cross-slide have hand and variable



self-acting reversible feed motion. Each spindle will swivel 30 deg. each side of perpendicular. The horizontal milling heads will also swivel 30 deg. on each side of horizontal. Single and double gearing are provided on each saddle. Thus, with the 9-speed gearbox, 18 spindle speeds, from 15 to 210 r.p.m., are available. Nine feeds for the horizontal heads are ½ to 4 in. per min., and for the table and vertical heads from 1 to 8 in. per min.

Milling Machine, Knee-Type

J. Parkinson & Son, Shipley, England. (Vol.76,p.651E.) 23.

This knee-type miller has both horizontal and vertical cutter spindles. Table working surface is 60x20½ in., longitudinal movement by hand or power, 32 in. and cross adjustment on the knee by hand 5 in. Vertical adjustment of knee, 12 in. The vertical spindle has transverse

adjustment of 4 in. in V-ways along the top of the column. Thus, the machine is suitable for dealing with work of moderate proportions presenting two surfaces in different planes. Either Stellite or tungsten-carbide-tipped blades can be used. Automatic movements of the table are controlled by a single lever. Quick power traverse, 100 in. per min.

Milling Machine, Knee-Type, Vertical, No. 15S

Alfred Herbert, Ltd., Coventry, England. (Vol.77,p.27E.)

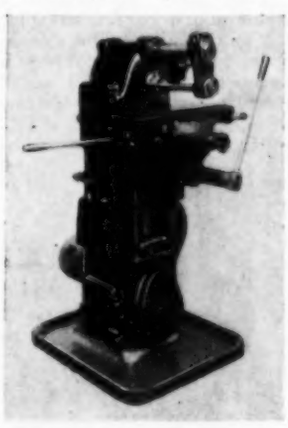
This machine has an adjustable head. Longitudinal feed is 30 in., transverse adjustment,

12½ in., and maximum distance from spindle to table, 21 in. Vertical adjustment of the table is 17 in. and of the spindle head, 3 in. Eight spindle speeds are from 51 to 700 r.p.m. The spindle nose has a clutch drive with provision for securing face cutters direct to the spindle. The table has a working surface of 49x10¾ in. Nine feeds are from 1½ to 20 in. per min., and are obtained by the firm's dial-feed motion. Electrically driven quick power traverse can be supplied at the rate of 150 in. per min.

Milling Machine, Plain, No. 1

Alfred Herbert, Ltd., Coventry, England. (Vol.77,p.587E.)

Spindle speeds range from 257 to 1,940 r.p.m. in six steps. Table working surface is 16x4½ in.; saddle transverse adjustment, 3¾ in.; table longitudinal movement, 7¾ in.; knee vertical

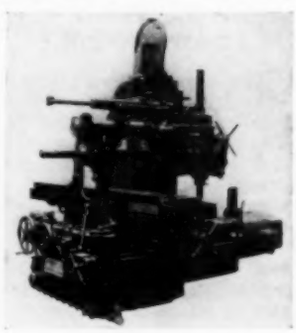


adjustment, 7 in.; maximum distance from center of spindle to table, 8 in. The spindle runs in ball and roller bearings, and drive is by a ¾-hp. motor. An adapter with B. & S. taper hole can be provided. Weight, 1,000 lb.

Milling Machine, Manufacturing

Alfred Herbert, Ltd., Coventry, England. (Vol.77,p.602E.)

The No. 33 kneeless machine has table working surface of 81x17 in.; automatic longitudinal feed of 60 in.; transverse adjustment, 9½ in.; vertical adjustment, 19 in.; distance from



column to arm brace, 28½ in.; distance from spindle to table, 21½ in. The column is offset with relation to the center of the saddle to bring the spindle central. The spindle is mounted on roller journal bearings, and a heavy flywheel assists in smooth cutting. Drive is by a 20-hp. flanged motor. The driving box gives eight changes of speed which are compounded with the gear change in the spindle head, giving sixteen speeds from 20 to 550 r.p.m. The spindle head carries a 5½-in. overhanging arm adjustable lengthwise. The 32 reversible automatic feeds are in two ranges, namely ¾ to 28½ in. per min. normal and 1¾ to 68 in. per min. rapid.

Milling Machine, Slot "Hydromill"

Craven Bros. (Manchester), Ltd., South Reddish, near Stockport, England. (Vol.77,p.28E.) 35.

This duplex horizontal slot miller has a table travel of 12 in. and an in-feed to each spindle of 1½ in. It will cut keyways in steel up to 12 in. x 1 in. x 1½ in. deep on work up to 6 in. in diameter, or will cut

cotterways up to 12 in. x 1 in. through 3 in. in diameter. The machine is designed to mill the slots by a number of reciprocations of the table with in-feed of the cutter at the end of each stroke. Both table traverse and the in-feed are entirely hydraulic as well as the change of direction. A dial-change gearbox gives nine spindle speeds ranging from 356 to 1,834 r.p.m. The hydraulic traverse is from 1 to 48 in. per min. The in-feed ranges from 0.001 to 0.02 in. The machine will mill two slots simultaneously.

Milling Machine, Slot, Automatic

Benrath Machine Tools, John Dalton St., Manchester, England. (Vol.77,p.104E.) 71.

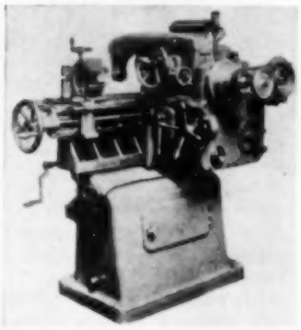
This machine cuts slots in locknuts, screw heads, and uses three milling cutters which operate simultaneously on three workpieces carried on an automatic dividing table. This machine is built by the firm of August Steinhauser, Feuerbach-Stuttgart, Germany.

The table is supported at an angle so that chips can be readily removed and also to enable the use of an automatic magazine. Periodically the table indexes through 60 deg. Three rocking arms carry the milling cutters, which may be either in single form or in sets for face milling. Each arm can be adjusted independently. Feed is operated by cams. The maximum diameter of work taken is 1½ in., maximum milling depth, 1⅛ in. the maximum width of single slots, 7/16 in., maximum length of workpiece 6 in., and cutters, 5 in. in diameter.

Milling Machine, Slot

Alfred H. Schutte, Cologne, Germany. (Vol.77,p.122E.) 82.

This machine mills T-slots, keyseats and straight-through slots. The general operation is first to drill the slot and then to mill it at the same work setting. In milling straight-through openings, however, combined milling cutters and drills are used. The cutter has a definite



undersize relative to the width of slot or groove and is given a floating movement within the amount of undersize in order to obtain a free-cutting drilling action. The cutter spindle runs in tapered roller bearings and the cutter is secured in the spindle by draw-in collets.

Milling Machine, Spline, Horizontal

Benrath Machine Tools, John Dalton St., Manchester, England. (Vol.77,p.104E.) 70.

This Hurth machine is suitable for small cutters from 1/16 to 3¼ in. in diameter. It

embodies a new depth feed mechanism by which the pressure of the feed varies with the diameter of the cutter, the action being automatic. The maximum length of slot plus the cutter diameter is 2¾ in., and the maximum depth of slot is 1 7/32 in. The table has a working surface of 14x6¾ in. Table remains stationary. The length of slot produced can be set by adjusting a crankpin carried on a disk. The table has cross movement only of 4¾ in. but can be arranged for vertical adjustment.

Facing Machine, End, Rotary

Carter & Wright, Halifax, England. (Vol.76,p.576E.) 11.

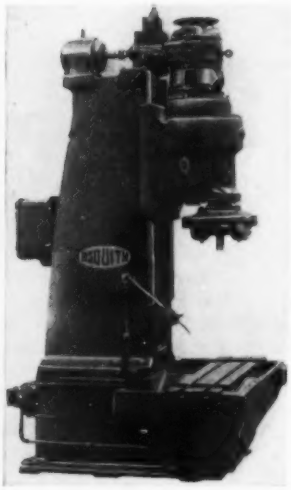
This machine faces the ends of girders, including work up to 3 ft. high by 5 ft. long. The saddle and cutter head have a traverse of 6 ft. The cutter head, 48 in. in diameter, is slotted on its outer rim to receive the inserted tools, and a steel rim is then shrunk on and

the tools are held in position by means of setscrews. The box section work-table has a surface of 8 ft. x 3 ft. 6 in. Drive is by 20-hp. motor. Feed motion is taken from feed gears giving three rates, namely, 3, 4½ and 6 in. per min.

Facing Machine, Rear-Axle

Wm. Asquith, Ltd., Halifax, England. (Vol.77,p.635E.) 243.

The head has sufficient vertical adjustment to enable the pilot bar to be withdrawn from the work fixture without having to disconnect the bar from the head. Working surface of table is 3 ft. by 13 in. wide.

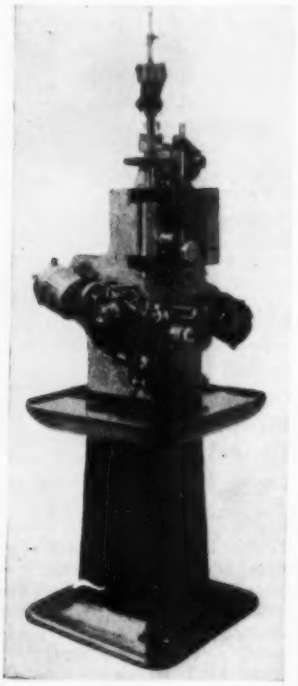


Drive to the spindle is direct by 7½-hp. motor. The spindle speed is 41 r.p.m., and the feed is 0.01 in. per rev., the total depth being ¼ in. Facing head has vertical traverse of 24 in.

Fluting Machine, Drill, Automatic

Selson Machine Tool Co., Ltd., Abbey House, Victoria St., Westminster, S. W., England. (Vol.77,p.474E.) 193.

This "Bergstrom - Contin" automatic drill fluting machine takes drills from 1 to 6 mm. in diameter. Drill blanks are held vertically in a chuck and fed past two profile cutters which simultaneously produce the grooves and perform the backing-off, the two operations at 180 deg. to each other. Hourly output is 40, 6-mm. drills. The magazine at the top has a plain inclined groove which receives the blanks previously cut to length. Capacity of the magazine corresponds to a two-hour output.



Profiling Machine, Fixed-Reduction

Taylor, Taylor & Hobson, Ltd., Leicester, England. (Vol. 77,p.286E.) 138.

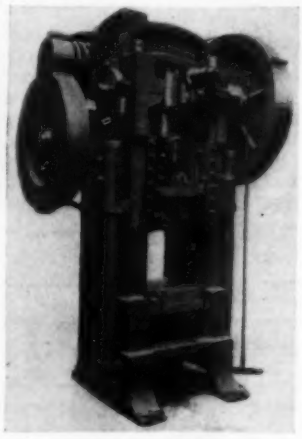
This machine is a fixed-reduction pantograph engraving type suitable for profile - milling operations as well as for ordinary engraving work. The pantograph uses templets five times the size of the work. The spindle takes a No. 1 B & S cutter. Feed mechanism provides fine feed and also rapid in-and-out motion by means of a cam.

Presses

Press, Straight-Sided, Single-Action

Taylor & Challen, Ltd., Birmingham, England. (Vol.77,p. 58E.) 46.

Pressure at the bottom of the stroke is estimated at 100 tons. The machine can be supplied for belt drive or drive from a 7½ hp. motor. The slide is balanced by four springs working in tubes and making the

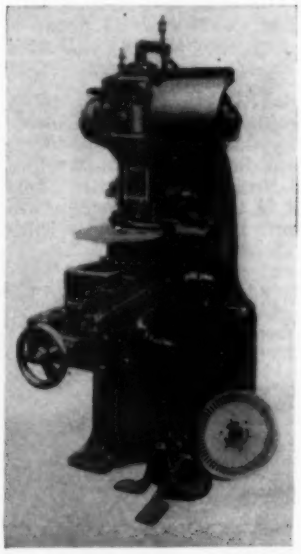


press easy to pull around for setting up. The backshaft has Timken roller bearings. The bed is prepared for air cylinders each exerting 14 tons pressure. Press has a 6 in. stroke and makes 56 strokes per min. Adjustment to slide is 3 in., width between the sides of the frame, 22½ in. and diameter of hole in slide, 2¾ in.

Press, Notching High-Speed

Taylor & Challen, Ltd., Birmingham, England. (Vol.77,p. 59E.) 50.

This press has a speed range from 350 to 700 notches per min. The largest disk notched is 17 in. in diameter and the smallest 3½ in. The stroke is ⅜ in. and the adjustment is 1½



in. Friction drive absorbs the shock occasioned by starting at high speed. Punching half-round or oblong notches on the outside periphery of disks, previously a separate operation, is done by means of an attachment. The dividing ring is readily changed for different numbers of notches.

Presses, Upright, Geared

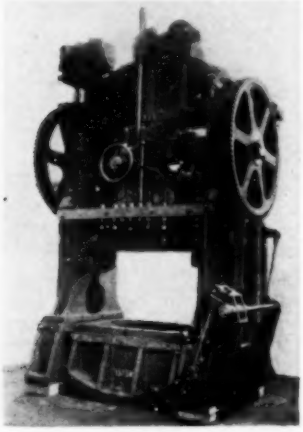
Benrath Machine Tools, John Dalton St., Manchester, England. (Vol.77,p.137E.) 89.

Built by Carl Hurth, Munich, Germany, these machines are pedal operated. The pedal operates a brake band that controls a revolving drum. The drum is connected with a planetary gear system and as soon as the pedal operates, the gearing drives the ram directly by rack and pinion. When the pedal pressure is removed or when the ram reaches its lowest position the movement is reversed and the ram moves upwards at accelerated speed. The sizes built are 1, 3 and 8 tons.

Press, Double-Crank, 200-Ton

Taylor & Challen, Ltd., Birmingham, England. (Vol.77,p. 141E.) 94.

This press is intended for metal doors, panels and plates for automobiles. The stroke is 8 in. as standard. Width between the uprights, 70 in.; between guides, 57 in.; adjustment of slide, 6 in.; area of slide, 34 in. front to back by 56 in.; bed,

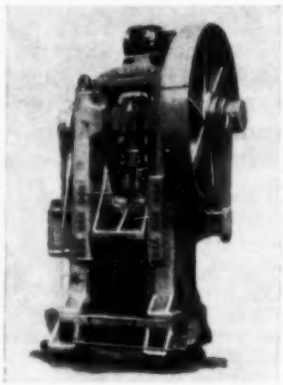


48 in. by 67 in.; hole in bed, 33x53 in. The slide is balanced by four compression springs in tubes and provision is made in the bed for air cushions. The machine makes fourteen strokes per min. Main driving motor, 25 hp.

Presses, Straight-Sided, Tie-Bolt

B. & S. Massey, Ltd., Openshaw, Manchester, England. (Vol.77,p.573E.) 227.

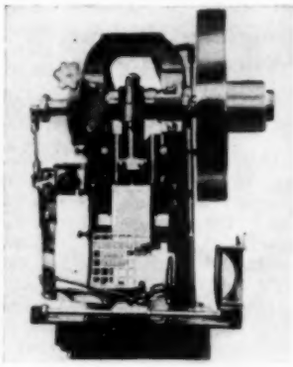
The barring device for tool setting is operated by the handle at the left-hand side. The device consists of a ratchet and toothed wheel by which the crank can be rotated and the ram thereby lowered. All presses are geared, single or double reduction. Frames are tied together by tie bolts. A separate slide is arranged for cutting off.



Press Guards, Improved

J. Broughton, Vere St., Birmingham, England. (Vol.77,p. 92E.) 67.

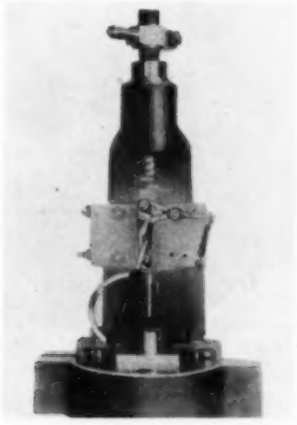
The Broughton-Positive and Newplex automatic side-by-side guards are now fitted with the firm's automatically operated swivelling shutter extension, which is in the form of an aluminum finger mounted at right angles to the sliding shutter. As the shutter travels across the front of the press, the extension finger moves with it and swings outwards, sweeping the hand of the operator away from the danger zone. The finger forms an extension to the shutter, thus guarding a greater tool space with less actual guard movement.



Press Guard, Automatic

J. Broughton, Vere St., Birmingham, England. (Vol.77,p. 178E.) 105.

This pendulum-type guard is for hand or fly presses and is actuated by a striker and cam. It sweeps across the tool space while the ram moves down ⅜ in. Adjustment is provided to compensate for any alteration in the height of the tools and also to regulate the amount of travel required on the hand guard. In blanking from strip the guard can be set to operate just above the level of the material.

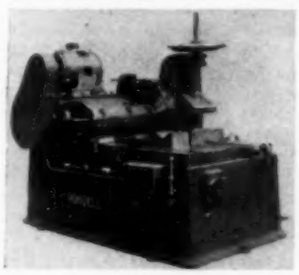


Sawing Machines

Sawing Machine, Cold, "Hydrofeed"

S. Russell & Sons, Ltd., Leicester, England. (Vol.77,p. 44E.) 43.

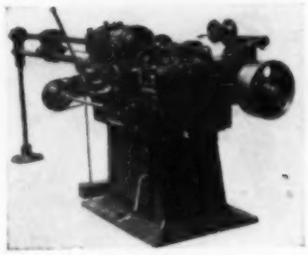
This hydraulically fed cold sawing machine has a permanently power-driven roller stock feed and also a hydraulically operated clamping vise. Cutting speed ranges from 35 to 90 ft. per min. The feed of the saw carriage has a normal range of 0 to 12 in. per min., but may be increased to 30 in. per min. Adjustable knock-offs disengage the feed at the end of the cut and return the saw carriage to the starting position by means of rapid traverse. The saw blade cuts upward through the material. The hydraulic feed is variable to cut at a constant rate regardless of the section of the material. Machine cuts 10 in. rounds.



Sawing Machine, Brass-Bar

Carter & Wright, Ltd., Halifax, England. (Vol.77,p.554E.) 218.

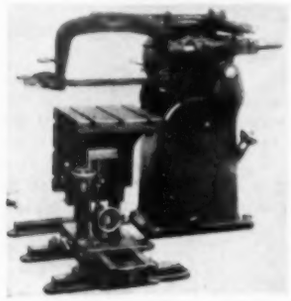
This machine will cut brass and gunmetal bars up to 3 in. The bar is revolved at 50 r.p.m., the saw blade at 500 r.p.m. and automatically fed to the center of the bar and then automatically returned to the out position. One lever operates the chuck on the work spindle and controls the feed gear for traversing the saw spindle head. When the chucking lever is thrown over, the chuck is opened and the automatic bar feed brings the bar against the stop.



Saw, Gate, "Rapidor"

E. G. Herbert, Ltd., Levenshulme, Manchester, England. (Vol.77,p.429E.) 176.

The gate saw shown is of 8x8 in. capacity, and is fitted with a three-speed gear belt drive. Saw holders are flush-sided so that the blade can cut the gate as nearly as possible flush with the casting. The saw is made in two units. The work-support table is mounted on slide rails and fitted with horizontal traverse and vertical adjustment. In the machine shown the table is 15x15 in. x 12 in. and is T-slotted. A vertical adjustment of 8 in. and horizontal traverse of 12 in. is obtained. The table is bolted on two slide rails, a third rail enabling it to be moved from the left-hand side of the machine to the right.



Hacksawing Machine, 6 x 6-In.

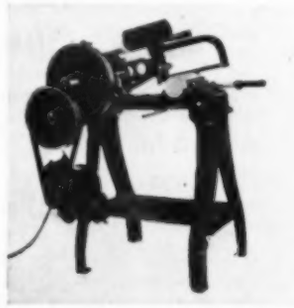
E. G. Herbert, Ltd., Levenshulme, Manchester, England. (Vol.77,p.76E.) 62.

This light hacksaw of 6x6-in. capacity has an automatic relief on the return stroke by means of an adjustable dashpot. Table is 18 in. long by 4 in. wide. The vise enables 4-in. stock to be mitred at 45 deg. Drive is by single pulley. The machine runs at 100 r.p.m. and 14-in. blades are used.

Hacksawing Machine

New Fortuna Machine Co., Ltd., Southmead, Bristol, England. (Vol.77,p.92E.) 68.

This is a small capacity machine for bench or floor-stand operation. Cutting capacity is up to 4x4-in. in steel, the saw blade length being 9 in., the stroke from 3 to 6½ in., and the power required about ¼ hp. An adjustable screw vise is fitted.



Hacksawing Machine, Foundry-Type

E. G. Herbert, Ltd., Levenshulme, Manchester, England. (Vol.77,p.314E.) 150.

This is the firm's standard 6x6-in. "New Manchester" saw mounted on a column. An apron, 9½ in. deep by 12 in. wide by 1½ in. thick is cast with the column. For ordinary work a table with vise can be supplied for bolting to this apron, while for special work the apron can be drilled for securing box jigs. The saw has automatic relief on the return stroke by an adjustable oil dashpot. The machine takes 15-in. blades. Speed of the pulley is 100 r.p.m. Overall the saw is 4 ft. high by 3 ft. 6 in. by 1 ft. 4 in. wide.

Hacksawing Machine, Engine-Driven

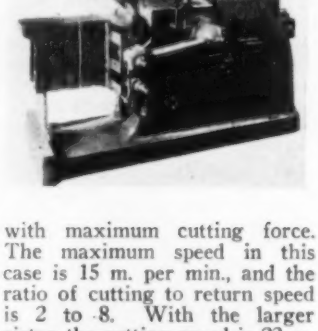
E. G. Herbert, Ltd., Levenshulme, Manchester, England. (Vol.77,p.125E.) 87.

The company's "Rapidor Minor" sawing machine has been combined with a 96 c.c. Villiers two-stroke petrol engine. Engine speed is controlled by a single lever carburetor, and the drive is taken through a worm-reduction box. The maximum speed of the saw is 200 strokes per min. and the capacity is 4-in. steam pipe. Necessary cooling, exhaust and silencing systems are provided. The engine is mounted on a baseplate fixed to the stand of the machine.

Shapers

Shaper, 18-In.

Butler Machine Tool Co., Ltd., Halifax, England. (Vol. 77,p.90E.) 65.



Body casting of this 18-in. shaper is of the buttress shape at the front and strongly ribbed inside to take the strain and twist of drive when cutting. The saddle has been increased in length and machined T-slots have been displaced by four short cast T-slots to prevent distortion when securing the

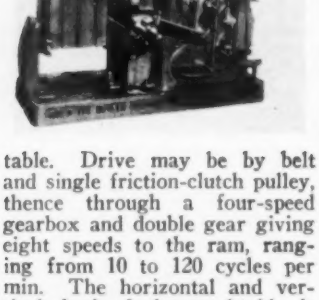


table. Drive may be by belt and single friction-clutch pulley, thence through a four-speed gearbox and double gear giving eight speeds to the ram, ranging from 10 to 120 cycles per min. The horizontal and vertical feed of the worktable is actuated from a slotted disk and ratchet wheel. Six ratios of feed range from 6 to 72 cuts per in.

Shaper, Hydraulic

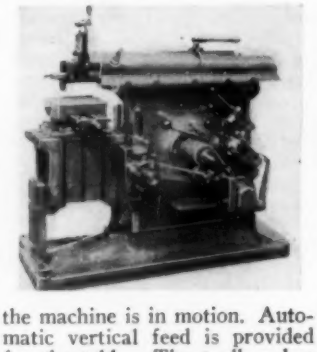
Wotan-Zimmermann, Dusseldorf, Germany. (Vol.77,p.120E.)

Subdivision of the oil pressure cylinder into three speed ranges enables the machine to be run with high return speeds when heavy roughing cuts are to be taken and, on the other hand, to reduce the return speeds with finishing cuts. The pressure oil may be supplied to either of two cylinder compartments having different volumes, or to both of them. In the last case, the oil acts on the largest possible piston area for the cutting stroke and therefore with maximum cutting force. The maximum speed in this case is 15 m. per min., and the ratio of cutting to return speed is 2 to 8. With the larger piston the cutting speed is 22 m. per min., and the smaller piston, 30 m. per min. Crossfeed is also hydraulic, up to 6.5 mm.

Shaper, General-Purpose

Butler Machine Tool Co., Ltd., Halifax, England. (Vol. 77,p.635E.) 242.

Two sizes, 18 and 26 in. stroke, are offered. Ram slides are chilled and ground. Eight speeds are 10 to 100 cycles per min. Length and position of stroke can be adjusted while



the machine is in motion. Automatic vertical feed is provided for the table. The toolbox has a graduated swivel front. Lubrication is automatic throughout.

Slotting Machine, Toolroom

Butler Machine Tool Co., Ltd., Halifax, England. Vol. 77,p.193E.) 109.

The body of the machine can be tilted 10 deg. backward or forward. The toolbox can be

located to face the front, sides or back and the cutting tools can be fixed in either the vertical or horizontal position. The circular table has an indexing mechanism to give $\frac{1}{12}$, $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{3}$ and $\frac{1}{2}$ of a circle. The cam mechanism provides seven feeds, ranging from 18 to 125 cuts per in. on the cross-feed and from 46 to 320 cuts per in. on the in-feed. Lever-controlled speeds are 31, 44, 63 and 90 cycles per min.

Other Machines

Bending and Hardening Machine, Spring

Stedall-Dowding Machine Tool Co., St. John St., Clerkenwell, E. C., England. (Vol.77, p.665E.) 27.

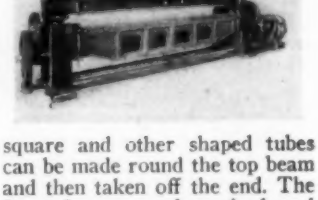
Made by Collet & Engelhard, Offenbach on Main, Germany, this machine will accommodate springs up to 5 ft., 7 ft., and 9 ft. in length. On a revolving drum are mounted two sets of mechanism diametrically opposite, each set comprising a die and templet made from lami-

nated springs. The templet will form any radius required, the die portion being operated by rack and pinion and used to bend the hot leaf spring round the templet. The amount of camber is shown by a dial. After the spring is bent it is plunged into a tank of water for quenching. The hardening time is predetermined. The machine works automatically and it is self-starting after every cycle of operation.

Bending and Folding Machine, Angle

Walter Frost, Crawford St., Rochdale, England. (Vol.77,p. 300E.) 146.

This machine has a beam which lifts a distance of 7 in. and also swings out. This feature permits the production of boxes from one piece of metal, bending up all four sides, while



square and other shaped tubes can be made round the top beam and then taken off the end. The front beam can be raised and lowered for producing sharp or round bends. Machines of this type are built up to 10 ft. wide.

Broaching Machine, Vertical, Hydraulic

A. C. Wickman, Ltd., Coventry, England. (Vol.77,p.458E.)

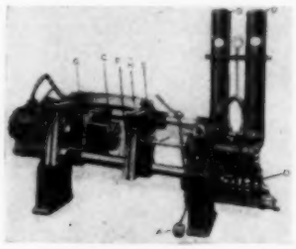
This Forst vertical broaching machine is built by the Coventry Machine Tool Works, Ltd. The lower end of the broach is placed in a tapered bushing in a lifting device, the

work itself being slipped over the top of the broach. When the cylinder of the broach-lifting device is put into operation, the broach is raised until it automatically connects with the holder, the work then resting against a self-aligning locating fixture held on the cross-tie of the machine. The broach-lifting device is then lowered and the broach passed through the work. At the end of the operating stroke the work is released and runs down a swiveling chute into a receptacle. The maximum length of stroke is 47 in., and the maximum pulling capacity is 10 tons. Maximum working speed of the broach is 40 ft. per min., and the return stroke is 66 ft. per min.

Die-Casting Machines, Brass

Gebr. Eckert, Nuremberg, Germany. (Vol.76,p.614E.) 15A.

This hydraulic, horizontal die-casting machine handles brass pieces. The first pedal movement closes the dies and the second movement advances the plunger to force the metal into the cavities of the mold. The third pedal movement opens the mold and a fourth pedal



movement withdraws the plunger. A pressure of 2,300 lb. is obtained from an accumulator. Cores may be moved manually or automatically. The machine is built in three sizes, the largest piece die-cast in a single operation being 4 lb. Output is from four to eight per min.

Drop Stamp, Friction, 40-Cwt.

B. & S. Massey, Ltd., Openshaw, Manchester, England. (Vol.77,p.524E.) 211.

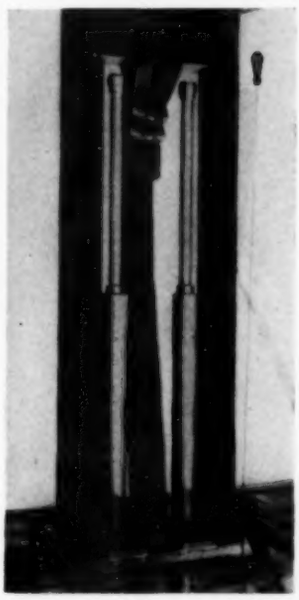
It is understood that this is the largest self-contained stamp yet made in Great Britain, and that it is fitted with the firm's "Simplex" automatic gear, a mechanical device for automatically pulling and releasing

the control cord of the stamp exactly as the driver does by hand. The action continues as long as the foot lever is held down. Length of stroke and point of pick-up can be adjusted from the floor level. The stamp has a maximum stroke of 6 ft. and will strike 35 full stroke blows per minute. Maximum power required, 100 hp.

Drop Stamp Accelerator

B. & S. Massey, Ltd., Openshaw, Manchester, England. (Vol.77,p.10E.) 28.

The number of blows obtainable per minute is increased while the force of the blow is maintained. The accelerator consists of two cylinders placed between the slides, one on each side of the lifting belt and supported from the girders. A piston rod projects downwards



from each cylinder. As the tup is lifted it comes in contact with these rods and forces them up into the cylinders, compressing air above the pistons. The energy stored in compressing the air on the up-stroke is utilized to increase the velocity of the fall, and, while the maximum stroke of the stamp is nearly halved, the effort of the blow is maintained.

Flanging Machine, Sheet-Metal, Irregular

Selson Machine Tool Co., Ltd., Abbey House, Victoria St., S. W., London, England. (Vol.77,p.489E.) 197.

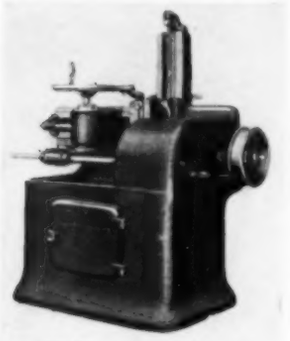
The "Rapid" irregular flanger is designed to perform difficult flanging jobs on sheet metal. Quick oscillation of a short

folder or head is used. The work is hand-fed under a hold-down tool and the edge to be formed is lightly pressed against an arc-shaped guide. The machine operates at 440 strokes per min. It has a maximum capacity of No. 18 gage aluminum and takes ½ hp. A larger machine deals with stock up to No. 12 gage.

Graduating Machine, Handwheel

Stedall - Dowding Machine Tool Co., St. John St., Clerkenwell, E. C., England. (Vol.77, p.430E.) 177.

This machine is built by Herbert Lindner, G.m.b.H. Berlin, and is suitable for dividing horizontally or vertically and at any angle between. It will take up work up to 28 in. in diameter when dividing horizontally and up to 32 in. when dividing vertically. Maximum stroke is $\frac{5}{16}$

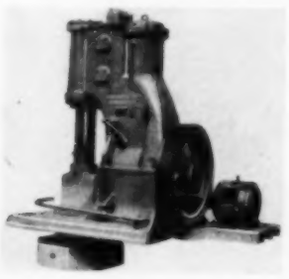


in., or for the fifth and tenth lines, ⅛ in. Dividing capacity, according to the required infeed of the handwheel, of the dials is 0.0001 in. infeed for screws of from 40 to 4 threads per in., 0.0005 in. from 12 to 4 threads per in., and 0.001 in. from 6 threads to 1 thread per in. with division to degrees up to 360 or with a special dividing attachment to ¼ deg. and ¼ deg. The guaranteed accuracy is 1 min. of arc.

Hammer, Pneumatic

B. & S. Massey, Ltd., Openshaw, Manchester, England. (Vol.77,p.364E.) 164.

"Clear Space" pneumatic hammers range in size from 2 to 20 cwt. They have totally inclosed working parts, automatic lubrication and hollow, forged steel

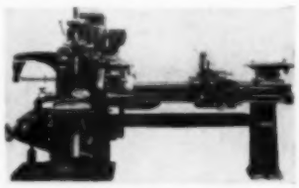


ram. The anvil block is octagonal in section and can be set so that the pallets are at either 45 or 90 deg. to the center line of the hammer. Better control of the blow is featured.

Machine Tool, Universal

Kitchen & Wade, Ltd., Halifax, England. (Vol.77,p.152E.) 96.

This machine comprises a lathe with the saddle arranged for boring operations, milling and shaping machines with automatic longitudinal feed to the table, a hacksaw attachment for the shaping machine, and a drilling machine. Three machines can be operated simultaneously. The lathe is of 7¼ in. centers and admits work 4 ft. between centers, swings 10 in. over the saddle and 20 in. in the



gap. The drilling machine drills up to 1¼ in. at the center of 25 in. in diameter, and admits work 14½ in. deep. The milling machine spindle has three speeds. The spindle is bored No. 3 Morse taper and the table is 24x8 in., and has 15 in. power traverse longitudinally. The cross-feed is 6 in. and vertical adjustment 20 in. The 9-in. stroke shaper has a maximum distance from the tool to the table of 10 in. The toolhead has a graduated swiveling motion and work up to 15 in. wide can be tooled.

Mixing Mill, Sand

Pneulec, Ltd., Mafeking Road, Smethwick, England. (Vol.77,p.61E.) 56.

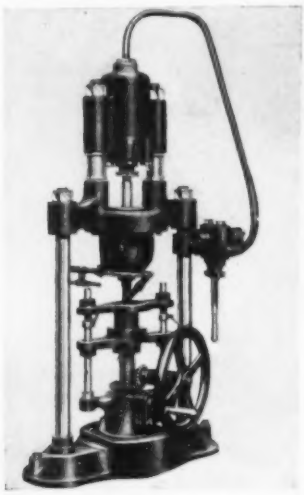
This machine for sand has both a runner for milling and beaters for mixing. The beaters have a constant agitating action on the sand which is constantly broken down and mixed.

The runner may be adjusted for clearance from the pan bottom. It is also carried on a rocker arm to allow for rise and fall. The machine illustrated has a 6-ft. pan with a batch capacity of 6 cwt. The main drive shaft is carried in three ball-bearing, self-aligning pedestals.

Molding Machine, Vertical

Gebr. Eckert, Nuremberg, Germany. (Vol.77,p.614E.) 15B.

This machine deals with cellulose-derivative compounds. The material may be applied either in the powdered condition or in the form of tablets. It is loaded into an inner cylinder surrounded by an outer cylinder,

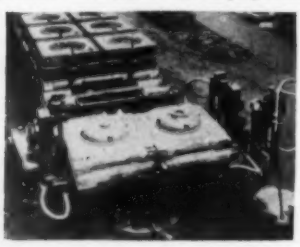


space between them forming an oil bath which is heated by gas burners. The handwheel is turned, the two mold halves are closed together and an air-actuated piston forces the material through the mouthpiece and into the die cavity. From four to ten pieces per minute can be produced.

Molding Machine, Jar-Rollover

Pneulec, Ltd., Mafeking Road, Smethwick, England. (Vol.77,p.44E.) 42.

The cycle of jarring, rolling-over and drawing the pattern is performed in one minute. All operations are hydraulically controlled. Where the equipment

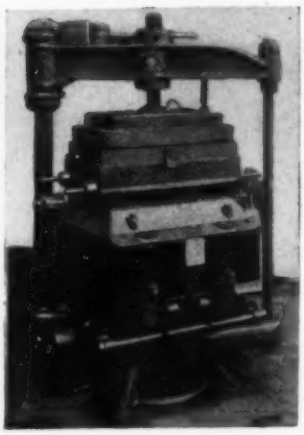


is suitable, arrangements may be made for the production of two half molds at each operation. The pattern draw has fast and slow operations and the turnover plate has a vibrator.

Molding Machine, Magnetic

Pneulec, Ltd., Smethwick, England. (Vol.77,p.59E.) 48.

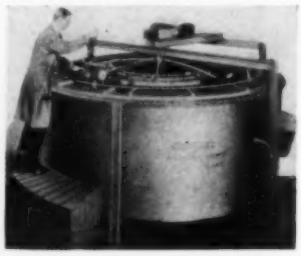
This machine has a rating of 11½ kw. Power is consumed only during the squeezing operation, no power being required for drawing the pattern. The pattern is stripped from the mold on the return stroke from squeezing, and is by gravity.



Plating Machine, Chromium, Rotary

W. Canning & Co., Ltd., Great Hampton St., Birmingham, England. (Vol.77,p.42E.)

The work is carried on a rotating cathode ring, the articles to be plated being hung by wires. The plating tank is surrounded by a water jacket for heating by steam or elec-

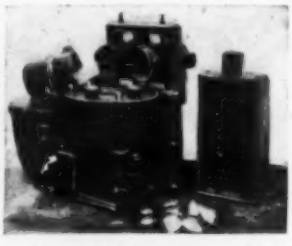


tricity. The solution is agitated by air. A fume exhaust system is included. The tank is 9 ft. in diameter by 2 ft. 10 in. deep and the height over-all is 6 ft. 2 in.

Polishing Machine, Hub-Cap

J. Holroyd & Co., Ltd., Milnrow, Lancashire, England. (Vol.77,p.554E.) 219.

The circular table carrying the caps is indexed into five positions. The work is done in three stages, first the edge being polished, then the face

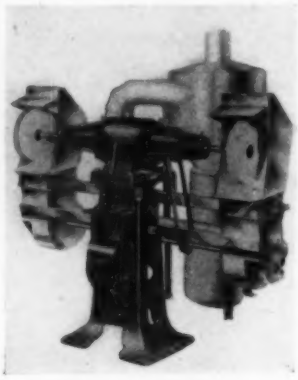


rough-polished and finally finish-polished. Each of the polishing motors is of 2 hp., and the polishing mop speed is 2,900 r.p.m.

Polishing Machine with Exhaust Unit

W. Canning & Co., Ltd., Great Hampton St., Birmingham, England. (Vol.77,p.58E.)

The motor has four bearings, two at the inner shield and two at the outer ends of the spindle brackets. The dust-extractor plant consists of two partly-inclosed, galvanized, sheet-iron

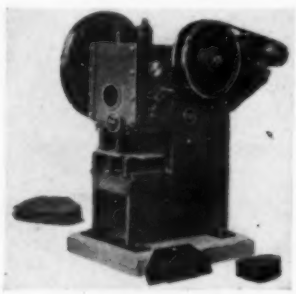


mop hoods with adjustable trays and cowls connected by ducts to a cyclone dust-collecting chamber with removable bag.

Press, Straightening

Henry Pels & Co., Ltd., Osnaburgh St., London, N. W., England. (Vol.77,p.417E.) 173.

Gusset, multi-cornered or round plates, usually bent when sheared to size, can be flattened on this press. The material passes between blocks, being subjected to pressure and counter pressure. The open gap renders the press accessible.

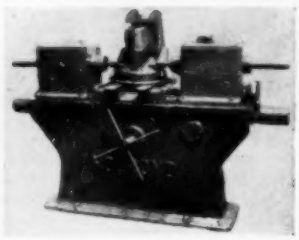


Drive is by a 2-hp. motor through a belt and pulley. The machine straightens plates up to 18 in. x ½ in. or 8 in. by ¾ in. at 5 in. distance between bottom blocks, and has a continuous maximum pressure of 50 tons.

Press, Bushing, Double-Ended, Horizontal

J. Holroyd & Co., Ltd., Milnrow, near Rochdale, England. (Vol.77,p.153E.) 98.

This machine presses the two bushings in the transmission cases of motors cars. The work is placed on a central jig and clamped and the bushings are

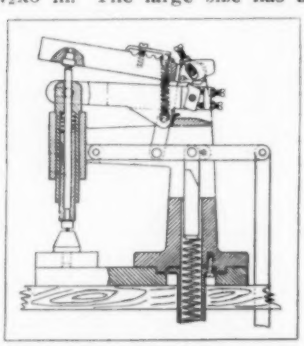


fed to the spindles by chutes. The speed of the spindle traverse is 2 ft. per min.

Rivet Staking Machine, Automatic, "Roebuck"

Buck & Hickman, Ltd., Whitechapel Road, London, E., England. (Vol.77,p.443E.) 179.

This machine stakes light metals with hollow rivets and is built in three sizes. The small size has a maximum stroke of 1⅛ in.; depth of throat, 1¼ in.; and space occupied 4½x6 in. The large size has a



maximum stroke of 2½ in.; depth of throat, 7¼ in.; and space occupied, 7x15 in.

Shape-Cutting Machine

Hancock & Co. (Engineers), Ltd., Croydon, England. (Vol. 77,p.470E.) 187.

The "Annular Simplex" profiling machine, a universal oxygen-jet cutting machine, has a maximum cutting area in one setting of 60 in. x 40 in. Steel plate or billet up to 8 in. thick can be cut with oxy-coal-gas, while greater thicknesses can be penetrated by using dissolved acetylene. A rotating head is

fitted with two cutting burners, and they may be employed to cut simultaneously the inside and outside of rings or flanges from 3 to 24 in. in diameter. The machine cuts at any angle up to 45 deg.

Shape-Cutting Machine

Hancock & Co. (Engineers), Ltd., Croydon, England. (Vol. 77,p.489E.) 196.

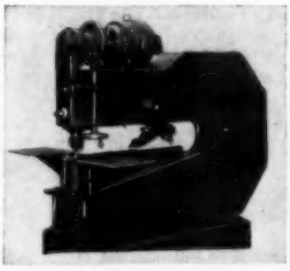
This portable machine cuts circles, straight lines and profiles, the drive being automatic through a small universal motor. The machine will cut bevels up to 35 deg. by means

of a swiveling head and is fitted with two sprung guide wheels, which normally engage with 1½-in. angle for straight cutting.

Shears, Nibbling

Henry Pels & Co., Ltd., Osnaburgh St., London, N. W., London, England. (Vol.77,p. 588E.) 230.

Sheets up to ¼ in. thick are cut at 1,400 strokes per min. The upper reciprocating nibbling

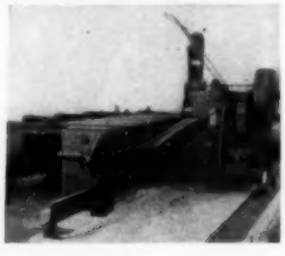


blade cuts the material against the square edge of the horizontal disk that forms the lower cutter. The machine is built in two sizes, one to cut 42-in. disks the other 50-in. disks.

Shears, Rotary

Henry Pels & Co., Ltd., Osnaburgh St., London, N. W., England. (Vol. 77,p.270E.) 132.

Each machine has a traveling shear head and a stationary table. As the cutters rotate with the plate between them, the friction causes the shearing head to travel along, so shearing the work. Depth of throat

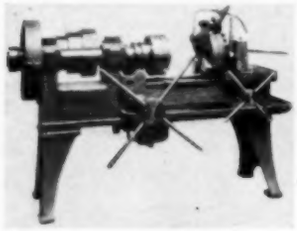


may be varied from 16 to 30 in. The head may be tilted for the shearing of welding edges up to 45 deg. The frame is built up of high tensile steel plates electrically welded. Machines are built in six sizes.

Threading and Cutting-Off Machine, Pipe

Charles Winn & Co., Ltd., Birmingham, England. (Vol.77, p.60E.) 51.

This machine has a range of ¼ to 2 in. and is fitted with a Landis stationary diehead with high-speed tangential chasers. The cutting-off slide is operated by a vertical lever and has a single cutting-off tool. The ma-



chine can be employed for making nipples with an auxiliary slide. A three-jaw chuck fits the tube.

Welding Machine, Bolt

A.E.G., Berlin, Germany. (Vol.76,p.558E.) 9A.

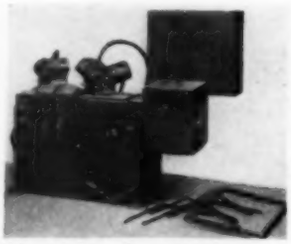
This welder is designed for the special purpose of welding screw bolts on sheet-steel. The upper ram carries an indexing head with three tools, namely a center punch, an ordinary copper electrode and a special elec-

trode receiving the bolt to be welded to the plate. The copper electrode locally preheats the spot. The special electrode welds the bolt to the sheet.

Welding Machine, Flash-Butt

A.E.G., Berlin, Germany. (Vol.76,p.558E.) 9C.

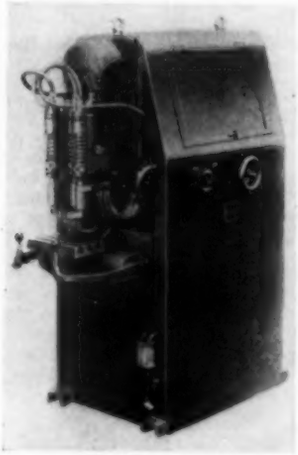
Mitre-welding window and door frames or sashes of various sizes and profiles can be done. The 650 k.v.a. welding transformer is housed within the machine base. The copper electrodes or work-claming jaws are interchangeable to suit various profiles or cross-sections. Flash welding and upsetting processes are carried through by a motor-driven cam.



Welding Machine, Spot, Automatic

A.E.G., Berlin, Germany. (Vol.76,p.588E.) 9B.

Machine automatically welds three spots on the same level simultaneously, but at variable relative distances. The electrodes on the upper head are cranked so that each of them

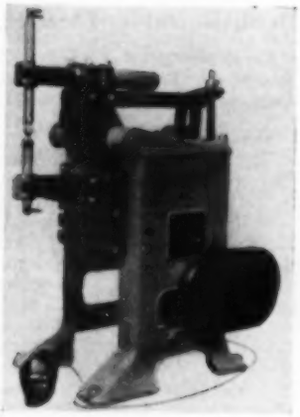


describes a circular path in adjusting them while the head itself as a unit is pivoted on another point. Hence, the triple-spot welding may be extended over a relatively wide range.

Welding Machine, Spot, Continuous

Holden & Hunt, Old Hill, Staffs, England. (Vol.77,p.45E.)

This continuous spot welding machine is of 30 kw. capacity and is intended for work where a number of spots are required



in quick succession. Stainless steel can be welded. Means are provided for fitting special jigs and stakes. The pedal may be adjusted forward, backward, or swung in complete half circle.

Wire-Drawing Machine, High-Speed, "Richards"

W. H. A. Robertson & Co., Ltd., Bedford, England. (Vol. 77,p.457E.) 182.

This high-speed 12-die machine is for drawing ferrous and non-ferrous metals to any dimensions between No. 25 and No. 50 S.W.G. on spools from 1¼ to 4 in. core diameter and from 1½ in. to 4½ in. traverse. The spools can be wound either hard drawn or loosely for annealing. Speed of drawing at the spool is from 2,000 to 4,000 ft. per min. A patent figure-eight system of stringing-up is employed, all the cones being used as drawing cones.

Portable Tools

Drills, Portable, Electric

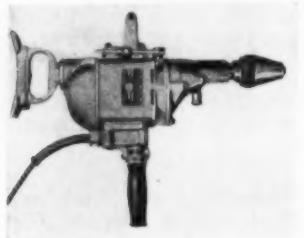
Grimston Electric Tools, Ltd., 138 Lever St., London, E.C., England. (Vol.77,p.443E.) 180.

The armature rotates on ball bearings and is dynamically balanced. Reduction gears are made from chrome alloy steel, hardened and ground. The ¼-in. drill has double reduction gears so that with an armature speed of 12,000 r.p.m., a speed of 1,200 r.p.m. on full load is obtained for the drill spindle. On the ⅜-in. size the drill spindle runs at 650 r.p.m.

Drill, Portable, Electric

S. Wolf & Co., Ltd., 115 Southwark St., London, S. E., England. (Vol.77,p.604E.) 235.

The ¾-in drill has load speed of 250 r.p.m., weighs 27 lb., and the over-all length with chuck is 19 in. The ⅝-in drill has load speed of 180 r.p.m., weighs 25 lb., and the length with chuck is 14 in. Universal motors are supplied. Armature spindle is mounted on ball bearings. Four aluminum alloy diecastings are used. The chuck takes straight-shank drills, but for taper-shank drills a special driving sleeve is supplied.



Floor Stand, Drill

S. Wolf & Co., Ltd., Southwark St., London, S. E., England. (Vol.77,p.124E.) 86.

This floor stand carries the firm's bench drill stand with lever feed and spring return. A solid steel pillar is used, and the double springs insure smooth feeding to the drill, which can

be raised or lowered or moved in a circular direction around the pillar. Depth of feed is 4½ in. The electric drill furnished is for continuous duty for ½-in. holes.

Flexible-Shaft Drive, Treadle-Operated

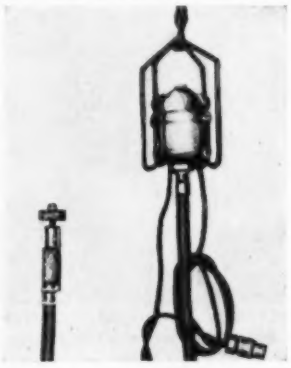
F. Gilman (B.S.T.), Ltd., High St., Smethwick, England. (Vol.77,p.59E.) 49.

Flexible shafts to a length of 4 ft. 6 in. are driven by a motor with a treadle control. Light grinding, sanding, milling and other operations can be undertaken. A running speed of 3,000 r.p.m. is available. Treadle operation leaves both hands of the operator free to manipulate the working head.

Flexible-Shaft Outfits

Loranco, Ltd., 42, Newlands Park, Sydenham, S. E., England. (Vol.77,p.348E.) 161.

The flexible-shaft outfit shown is for high-speed grinding and polishing on metals and tungsten carbide. The outfit is also suitable for internal grinding by hand control or in the lathe. Wheels employed range from ⅛ to 2½ in. in diameter, and the speed is 12,000 r.p.m. A ¼-hp.



universal motor is supplied. The flexible shaft core is 4 ft. long. The chuck runs on double-ball bearings and takes tools with 5-mm. shank. Also available is a flexible shaft with integral gears for a speed of 40,000 r.p.m.

Flexible-Shaft Machine, Portable

Loranco, Ltd., 38 Sydenham Road, London, S.E., England. (Vol.77,p.469E.) 186.

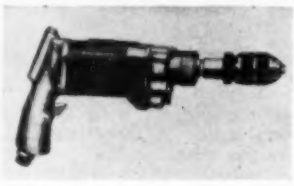
This flexible shaft outfit has universal features for filing, diesinking, grinding, polishing, drilling and other purposes. The

outfit is available in three types. One is with an overhead support for the motor suitable for running on a rail; the second has a stand for mounting on the bench, and in the third type the motor is mounted on a floor stand which is provided with wheels. The ball-bearing ½-hp. motor runs at 2,800 r.p.m. and the gear box gives eight speeds ranging from 850 to 9,400 r.p.m. The three sizes of flexible shafts available are 6-mm., 10-mm. and 12-mm. core diameter.

Grinders, Portable

Armstrong, Whitworth & Co. (Engineers), Ltd., Newcastle-on-Tyne, England. (Vol.76,p. 634E.) 17.

Rotary air motors are used in these grinders and other portable tools such as a combined drill and grinder and a sander. The rotor carries four blades or vanes. Speeds as high as 8,000 r.p.m. can be secured. Ball

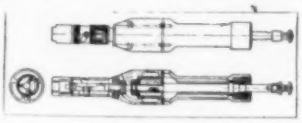


bearings carry the rotating parts of the motor, which is easily dismantled. Stator liners are renewable.

Grinders, Portable

F. Gilman (B.S.T.), Ltd., High St., Smethwick, England. (Vol.77,p.43E.) 40.

Finishing of dies and die castings is done by this air-operated high-speed grinder. Air is admitted by a sleeve through a passage valve which passes through into the body of the tool, through the inlet hole passage into the inlet holes and



vanes. The vane housing is eccentric with the liner in the body. Wheels up to 1¼ to 2 in. diameter can be mounted on the driving spindle. A special adapter takes pencil wheels.

Grinder, Die, Portable

Bosch, Ltd., Larden Road, Acton, W., England. (Vol.77, p.76E.) 63.

The description of this device will be found in the American Section, page 56.

Grinders, Portable, Pneumatic

Holman Bros., Ltd., Camborne, England. (Vol.77,p. 618E.) 236.

These "Rotogrinds" are built in three sizes. The smallest is for finishing dies. The free speed is 16,700 r.p.m., and the standard wheel is 2x¼x⅛ in. Weight is 4 lb. and length, 14½ in. An intermediate size is for

cleaning up castings and internal grinding. The length is 16 to 18 in. and the weight, 9½ lb. Free speed is 10,500 r.p.m., and wheel size, 4x1x½ in. The largest size is offered for all classes of grinding and is made in six styles. Over-all length is 22½ in. as a maximum; weight, 12 lb. Elastic wheels from 6 to 8 in. by 1½ in. face are used.

Hammer, Chipping, Pneumatic

Sir W. G. Armstrong Whitworth Co. (Engineers), Ltd., Newcastle-on-Tyne, England. (Vol.77,p.589E.) 232.

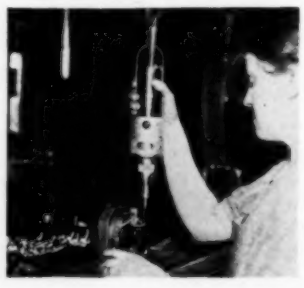
The hammer weighs 2 lb. 4 oz. The piston operates without the aid of valves. The cylinder has a port above and below the differential piston. On the downward stroke the upper port is

open and the lower port is closed so that the air pressure causes a cushioning effect that returns the piston. On the upward stroke the same effect is produced. Over-all length is 6¾ in. The chipping cutters have parallel shanks and are merely pushed into a bushing.

Screw-Driver, Portable, Electric

Bosch, Ltd., Larden Road, Acton, W., England. (Vol.77, p.123E.) 84.

The description of this device will be found in the American Section, page 56.

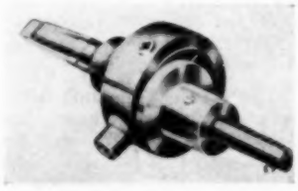


Small Tools

Boring Head, Adjustable

Mortimer Engineering Co., Acton Lane, Harlesden, N. W., England. (Vol.77,p.507E.) 207.

The "Excentra" adjustable boring head is intended for use in lathes, horizontal and vertical milling machines and boring machines. It is suitable for boring up to 10 in. in diameter. For holes up to 3 $\frac{9}{16}$ in. the end

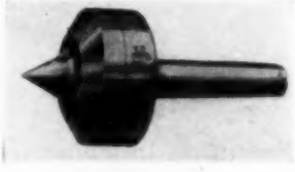


of the holder which carries the boring bar is carried in dovetailed guides and adjustment is made by means of a fine screw. A graduated collar reading to 0.001 in. is fitted. A No. 4 Morse taper shank is supplied.

Centers, Roller-Bearing

Wearden & Guylee, Ltd., Bradford, England. (Vol.76,p. 650E.) 22.

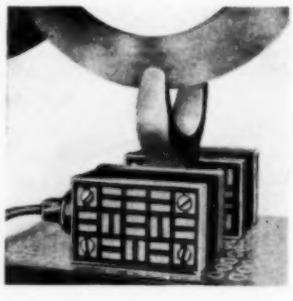
"Vortex" centers for heavy loads use Timken bearings. The main bearing is mounted close to the revolving center with avoidance of overhang, and at the tail end a ball-thrust bearing is provided. Five standard sizes are available.



Chucks, Magnetic

Loranco, Ltd., Newlands Park, Sydenham, S.E., England. (Vol.77,p.332E.) 156.

This magnetic chuck is for use on the marking-out table in the shop and toolroom. The illustration shows two small chucks mounted on the magnetic chuck of a machine for holding a fork for grinding. The chucks

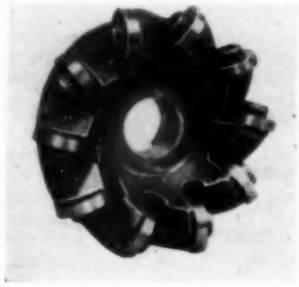


are made narrow and shallow to give maximum convenience in use and are supplied in various lengths up to 12 in. They are 2$\frac{3}{4}$ in. wide by 2$\frac{3}{4}$ in. high.

Cutter, Facing, Circular-Tool

Samuel Osborn & Co., Ltd., Sheffield, England. (Vol.76,p. 543E.) 5.

Facing cutter works on the same principle as the circular or button tool used in wheel and other lathes. The teeth are circular disks and are held in position on the body by hardened



retaining screws. These teeth can be rotated on a center holding screw so they can be used over the whole of their circumference before regrinding. Bodies can be made any size but the blades are standardized at 1$\frac{1}{2}$ in. diameter.

Dieheads, Self-Opening

Alfred Herbert, Ltd., Coventry, England. (Vol.77,p.243E.)

This diehead is built in stationary and rotary styles and uses tangential dies. The rotary head is opened and closed automatically by sliding the outer sleeve backwards and forwards by means of a bracket. For the full range of English, American and metric threads three dieholders are required.

The stationary-type diehead is opened by arresting the travel of the slide carrying the head,

the front of the head drawing forward and releasing the dies. These dieheads are available in two sizes, $\frac{3}{4}$ in. and 1$\frac{1}{4}$ in.

Diehead Attachments

Alfred Herbert, Ltd., Coventry, England. (Vol.77,p.153E.)

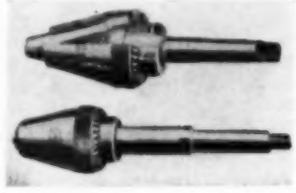
The first attachment enables the diehead to be used for cutting very short threads. The device consists of a hinged arm at the back of the detent pin handle which, on coming into

contact with a stop on the lathe, withdraws the detent pin and opens the diehead instantly. The second attachment is for mounting the diehead on a center lathe. The holder slides over the barrel of the tailstock and is clamped by a bolt.

Drill Chuck

Brooke Tool Mfg. Co., Ltd., Greet, Birmingham, England. (Vol.77,p.45E.) 44.

All parts of this drill chuck are hardened, including the integral shank, the key gear, the operating cone, the body and the jaws, the last being of alloy



steel. The chuck is made in a range of sizes from $\frac{1}{4}$ to $\frac{3}{4}$ in. and in both taper arbor and threaded arbor models, and also integral with a machine spindle.

Hacksaw Frames, "Eclipse"

James Neill & Co. (Sheffield), Ltd., Sheffield, England. (Vol.77,p.242E.) 121.

On the tubular-pattern frame the tension pieces cannot fall out of the sockets. The metal handle is made in one piece and the frame is now chromium-plated. Another model with a

pistol grip is adjustable for blades 12 in. long. A third model is a telescopic type for blades from 8 to 12 in. long.

Hammer Drill, Mechanical

W. Geipel, Ltd., Bermondsey St., London, S.E., England. (Vol.76,p.576E.) 12.

The tool is a combination of drill, hammerhead and worm, the last raising and releasing

the hammerhead and also rotating the drill. A stiff spring imparts regular uniform blows to the hammerhead at 1,000 to 1,500 per min.

Lathe Tools, "Fanger"

Wearden & Guylee, Ltd., Bradford, England. (Vol.77,p. 285E.) 136.

Tools for turning, facing, parting-off and threading are being marketed. The cutter may be of high-speed steel or cobalt steel, and is clamped against the hardened chrome-nickel steel holder by means of a pad and screw. It is locked at an angle

that gives the required cutting rake while insuring that the cutting pressure is distributed over the supporting surface. On one side of the cutter are serrations forming part of a thread with which the worm screw engages. Thus, the height of the tool can be adjusted.

Milling Cutter, Inserted-Blade

A. C. Wickman, Ltd., Coventry, England. (Vol.77,p.620E.)

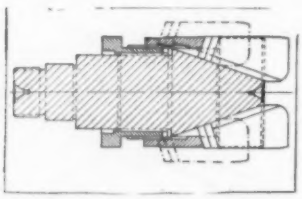
Wimet-tipped blades are used in this cutter made in seven sizes from 3$\frac{1}{2}$ to 10 in. in diameter. Two blades are held by one clamp. Blade shanks are

serrated to match serrations on the clamps. Rigid locking and simple adjustment result. The maximum number of blades has been provided to reduce chip pressure per tooth.

Reamer, Adjustable

Turner's Motor Manufacturing Co., Ltd., Wolverhampton, England. (Vol.77,p.313E.) 148.

A set of five heads is available in sizes from 2 $\frac{3}{16}$ to 4 $\frac{3}{4}$ in. In the smaller models the blades are $\frac{1}{16}$ in. thick and in the larger $\frac{1}{4}$ in., each blade being 2 $\frac{1}{4}$ in. long. Six blades are

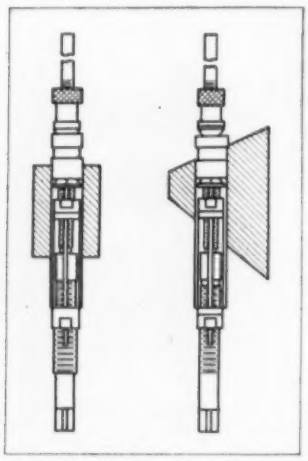


used, being high-speed steel. They have T-shaped heads. The blades give a boring and follow-reaming action.

Reamer, Expanding

E. L. Youngleson, Ltd., 67 Chancery Lane, London, W. C., England. (Vol.77,p.652E.) 249.

Main features are the long pilot integral with the body of the reamer and an additional expanding guide that provides steady bearing for the pilot. The pilot engages with the guide before the cutting edges enter the hole. It is thus possible to



grind the cutting edges parallel on the entire length and get a truly parallel hole. The body consists of a parallel shank with square, a two-diameter threaded part with taper splines to accommodate six blades.

Saw, Cold, Segmental

Sanderson Bros. & Newbould, Ltd., Sheffield, England. (Vol.77,p.43E.) 41.

The Sandbold segmental cold saw is built up of a number of segments, each with two, three or four teeth according to the pitch. Each segment at the front has a long radial tongue that fits at the top part in a corresponding groove in the preceding segment and at the lower part in the body of the saw itself, the whole being held together by rivets. The segments are of super high-speed steel. Sizes range from 11 to 72 in. in diameter and the width of cut from 0.16 to 0.51 in.

Soldering Irons, Electric

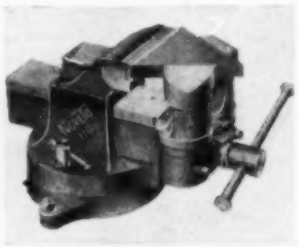
General Electric Co., Ltd., Kingsway, W.C., England. (Vol.77,p.108E.) 75.

The element wire is embedded in refractory and rating is approximately 300 watts. Iron is suitable for medium and heavy duty, and will withstand prolonged heating without use.

Vise, Universal

E. L. Youngleson, Ltd., 67 Chancery Lane, London, W. C., England. (Vol.77,p.192E.) 108.

This "Noveto" vise has a cast steel body in which slides the movable jaw. Instead of having the gripping face integral the jaw is composed of three main parts, a sliding part and two swiveling jaw posts. Thus,

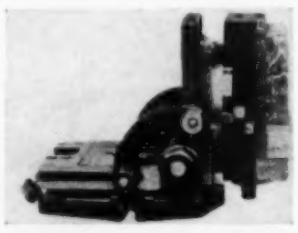


the usual tangent grip of two parallel jaw faces is replaced by a three-point grip which can be varied by swiveling the jaw posts to accommodate the work.

Vise, Machine, Universal

Roberts, Black & Co., Ltd., Bridge St., Manchester, England. (Vol.77,p.653E.) 250.

Three independent swivelling motions are provided in this vise which is built around a hinged angle member. One side can be swung upwards 90 deg., controlled by vernier. The base part of the hinged member can



be rotated horizontally 360 deg. by vernier. On the swinging part of the hinged member is the vise which can also be swiveled 360 deg.

Gaging, Measuring and Testing Equipment

Centers, Bench

J. Parkinson & Son, Shipley, England. (Vol.77,p.379E.) 167.

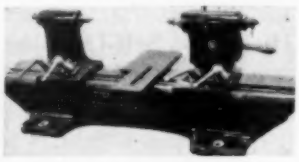
The centers will take pieces of 16 in. swing by 36 in. long. The left-hand spindle is fixed while the right-hand spindle is movable and in addition is

spring-loaded. Both headstocks are longitudinally adjustable the full length of the 54-in. bed. The dial indicator stand has two universal swivels.

Centers, Bench

Jones & Shipman, Ltd., Leicester, England. (Vol.77,p. 297E.) 141.

Light and heavy bench centers have Morse taper shanks, the left-hand center being fixed in its headstock, while the right-hand center is carried in a hardened and ground steel sleeve, lever-operated. Both heads are longitudinally adjust-



able. An additional T-slot accommodates an adjustable bracket for a micrometer. In the light type the capacity is 8 in. x 2 in., and in the heavy type 15 $\frac{1}{2}$ in. x 24 in.

Gage, Internal

George H. Alexander (Machinery), Ltd., Coleshill St., Birmingham, England. (Vol. 76,p.556E.) 6.

Made in three models, namely, single-ended, as shown, double-ended for go and not-go limits, and with swivel head with long handles attached so that the gaging edges can be moved across the center for gaging long bores. The distinctive feature is the employment of a spring plate with two opposed

gaging edges, the distance between which is varied as required by forcing the plate from the straight to a slight bow form. The standard single- and double-ended gages are made with heads in sizes ranging from $\frac{1}{2}$ to 6 in. in diameter.

Dial Indicator

J. Leete & Co., Percy St., Coventry, England. (Vol.77,p. 418E.) 174.

The case is aluminum with a spherical back and has a back lug die-cast integral and provided with $\frac{1}{4}$ in. hole for mounting purposes. Indicator's accuracy is guaranteed and on all standard instruments it lies between Grade A and Grade B National Physical Laboratory certificate.

Micrometers, Plain and Thread

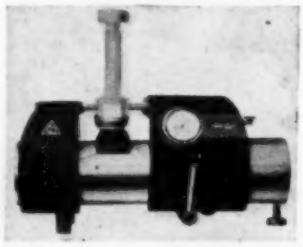
Stedall-Dowding Machine Tool Co., 145 St. John St., Clerkenwell, E.C., England. (Vol.77,p.105E.) 73 A.

This thread micrometer has a chromium-plated body and a barrel with dull finish. On this ground the graduations and figuring stand out clearly. The instrument is graduated to read 0.001 in. or 0.0001 in.

Measuring Instrument, External, Cylindrical

Stedall-Dowding Machine Tool Co., 145 St. John St., Clerkenwell, E. C., England. (Vol.77,p.106E.) 73 B.

This measuring machine is graduated to read to 0.001 mm. or 0.0001 in. Two sizes are available for external measurements from 0 to 6 in., and from 0 to 12 in. The instrument is intended mainly for use as a comparator, being set first to a master plug, screw, or ring

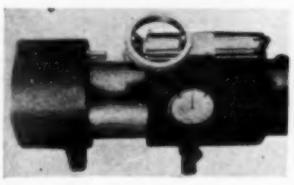


gage. A cylindrical ground bed carries a fixed head at the left-hand end with a stationary anvil. The measuring head slides on the bed and is traversed by rack and pinion motion and held in contact with the work by spring pressure. Anvils are available for checking plain and threaded work.

Measuring Instrument, Internal

Stedall-Dowding Machine Tool Co., 145 St. John St., Clerkenwell, E. C., England. (Vol.77,p.106E.) 73 C.

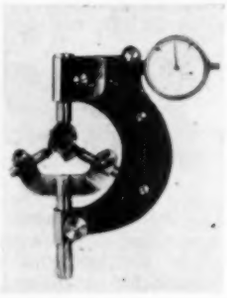
For checking internal work, this instrument is arranged with a mechanism on the top of the standard movable measuring head for external work. The work is centered by a jaw having two contact points. This jaw, although adjustable for rough positioning, serves as the fixed jaw for taking measurements. The single contact point opposite is movable.



Measuring Instrument, Tap

Steddall-Dowding Machine Tool Co., 145 St. John St., Clerkenwell, E.C., England. (Vol.77,p.106E.) 73 D.

This instrument for checking three-flute taps has a three-point contact, two lower points being fixed and the upper one movable. The lower points are carried in a shoe that is vertically adjustable. They consist of independently adjustable anvils with interchangeable thread tips. The upper movable anvil is spring-controlled.



Measuring Instrument, Gear

Steddall-Dowding Machine Tool Co., 145 St. John St., Clerkenwell, E.C., England. (Vol.77,p.107E.) 73 E.

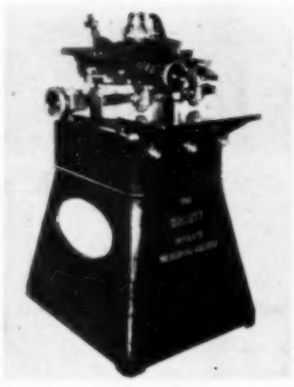
This instrument checks the concentricity and uniformity of tooth thickness and pitch of spur, spiral, worm and bevel gears. Measurements can be taken to limits of 0.01 mm. or 0.0005 in. A base carries the work and the measuring unit side by side. The gear is placed on a vertical arbor and rotated for the consecutive checking of all tooth elements.

At top of the measuring unit is an arbor, one end of which is bored to take the various measuring points, while the other end carries a stop which acts on the indicator. A similar instrument uses feeler points.

Measuring Machine, Involute

A. C. Wickman, Ltd., Coventry, England. (Vol.77,p.193E.)

This "Orcutt" involute measuring machine is made by the Gear Grinding Co., Ltd., Birmingham, and will measure any involute struck from a base circle between 1 and 13 in. in diameter on spur, helical and internal gears, and Fellows-type cutters, straight or helical. The only setting necessary is the base-circle radius of the gear under test. This is set by a Zeiss glass scale and microscope. Graduations to 0.0001 in. are obtained to indicate errors in the involute form and the base circle radius.



Balancing Machines, Universal

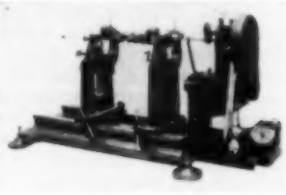
Selson Machine Tool Co., Ltd., Abbey House, Westminster, S. W., England. (Vol.77, p.571E.) 224.

Seven sizes of the machine will deal respectively with 1 lb. and 1,750 lb. and up to 27½ in. diameter by 50 ft. long. To counteract the forces of unbalance a variable magnetic attraction is applied and is recorded on the machine in such a way that the forces may be read off in weight and the position shown for correction. The part is mounted between centers and coupled to a motor for running at the critical speed.

Balancing Machines, Static-Dynamic, Olsen-Lundgren

E. G. Herbert, Ltd., Levenshulme, Manchester, England. (Vol.77,p.621E.) 240.

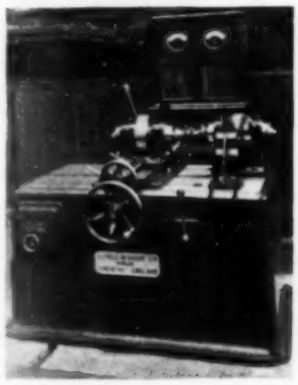
The machine shows the static, dynamic or combined static and dynamic balance of the part. Angle of unbalance at the ends is indicated by an electric sparking device. The part is driven at constant speed by a motor. The bearings at each end are alternately locked and the free end allowed to oscillate. The amount of unbalance is measured by calibrated springs against which micrometer sleeves presses. The micrometer is graduated in oz.-in.



Comparator, Gear-Noise

Alfred Herbert, Ltd., Coventry, England. (Vol.77,p.238E.)

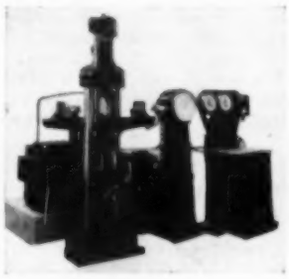
Gearing can be tested for noise on this machine, the gears being mounted in mesh so that one drives the other and the noise caused being picked up by a microphone. The sound is amplified and shown on a dial through a volume controller. A second dial indicates the power being transmitted through the gears.



Testing Machine, Universal, Hydraulic

Selson Machine Tool Co., Ltd., Abbey House, Westminster,, S.W., England. (Vol.77, p.493E.) 204.

An outfit has been designed to effect tensile, compression and traverse tests on material under alternating stress as well as static tests. A separate box-shaped casing contains the alternating stress mechanism. Normal testing speed is about 8 in. per min., and the grip heads will clamp flat or round rods. The hydraulic power is applied by means of a multi-piston motor-driven pump working at 100 strokes per sec.



Testing Machine, Weld

Murex Welding Processes, Ltd., Walthamstow, E., England. (Vol.77,p.472E.) 190.

This hand-operated machine for the bend testing of welded joints, has an hydraulic jack mounted on a steel table. The head of the jack is slotted to take a plunger which makes contact with the underside of the specimen along the welded joint.

Crack Detecting Apparatus

Equipment & Engineering Co., Ltd., 2 and 3 Norfolk St., Strand, W.C., England. (Vol. 77,p.492E.) 202.

The part under test is highly magnetized, causing lines of force to flow through the part. Where a crack occurs the lines of force are broken and so emerge on the surface. Two

models of the apparatus are built. One takes parts up to 30 in. long by 7 sq. in. in cross-sectional area, whereas the other takes parts 25 in. long.

Testing Apparatus, Weld

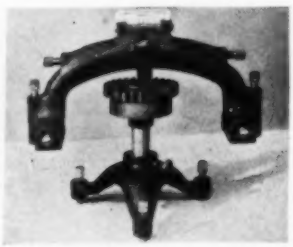
A. E. G., Berlin, Germany. (Vol.77,p.651E.) 248.

This non-destructive apparatus is based on the principle that in a magnetized body hair cracks, pipes or other faults give rise to unsteadiness or leakage of the magnetic flux. Such leakage may be made audible. Simple butt and fillet welds as well as welds of more complicated character can be tested.

Hardness Tester, Pendulum

Edward G. Herbert, Ltd. Levenhulme, Manchester, England. (Vol.77,p.392E.) 171.

A simplified model of the standard Herbert pendulum hardness tester enables rapid and accurate tests to be made on a number of special steels, widely different in their properties, which may be at any time in various stages of treatment in the shops. The instrument consists of an arched weight of 4 kg., in the middle of which



is accommodation for a steel ball of 1 mm. diameter, by which it may swing as a pendulum.

Spanner, Torque-Testing

Selson Machine Tool Co., Ltd., Victoria St., Westminster, S.W., England. (Vol.77,p. 507E.) 208.

The spanner consists of two members, one being the nut shank with a specially reduced end for fitting into the handle part which carries the indicator.

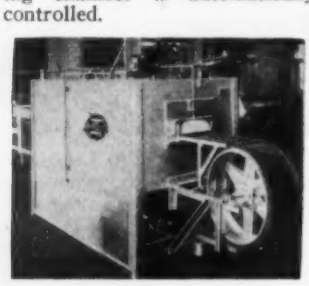
Shanks of different length can be fitted into the same handle. The indicator is carried in a hook-shaped cavity. The reading on the indicator is used in conjunction with a chart.

Furnaces and Equipment

Furnace, Bright-Annealing

Birmingham Electric Furnaces, Ltd., Birmingham, England. (Vol.77,p.62E.) 58.

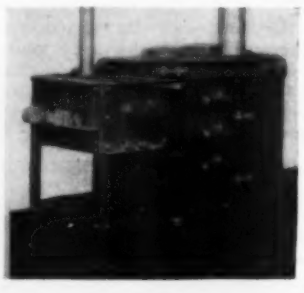
The work is maintained in a neutral or reducing atmosphere while it is given heat-treatment and afterwards while it is cooled to a temperature at which it may be exposed to air. A light belt of heat-resisting wire mesh passes continuously through both chambers. The gas is supplied by an ammonia burner plant. Temperature of the heating chamber is automatically controlled.



Furnace, Hardening

Brayshaw Furnace & Tools, Ltd., Hulme, Manchester, England. (Vol.77,p.11E.) 31.

Twin vertical chambers, one 12 in. in diameter by 24 in. deep and the other 7½ in. in diameter by 24 in. deep, besides two horizontal chambers, 6 in. sq. by 12 in. long are found in this gas-fired furnace for hardening high-speed tools, particularly reamers. Temperatures to 1,350 deg. C. are obtained.



Furnaces, Heat-Treating, Induction

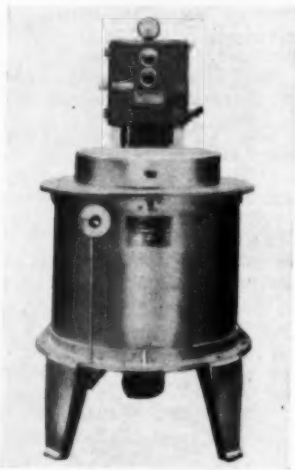
Electric Resistance Furnace Co., Ltd., 17 Victoria St., Westminster, S.W., England. (Vol. 77,p.461E.) 189.

A self-regulating induction furnace for heat-treatment and low-temperature metal melting is designed for direct connection to ordinary low-tension mains. Any temperature between 400 and 1,000 deg. C. can be controlled by the insertion of special alloy self-regulating bars. These bars lose their magnetism at the required temperature and the input of energy is diminished until the bars regain their magnetism when the load is automatically increased.

Furnace, Tempering, Electric

Wild-Barfield Electric Furnaces, Ltd., North Road, Holloway, N., England. (Vol.77,p. 491E.) 201.

A forced-air circulation system is used in this toolroom type of electric tempering furnace, designed for temperatures up to 650 deg. C. The chamber is 18 in. in diameter by 18 in. deep with an inner container 11 in. in diameter by 11 in. deep. The latter is of refractory material.

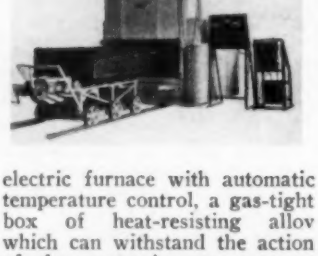


The work basket is 10 in. in diameter by 10 in. deep, perforated at the bottom to permit free circulation of air.

Furnaces, Nitriding

General Electric Co., Ltd., Kingsway, London, W.C., England. (Vol.77,p.227E.) 117.

Working with the Nitralloy, Ltd., Sheffield, the above company is supplying equipment for the nitriding process for the surface hardening of Nitralloy steels and Nitri cast iron. A complete installation includes an

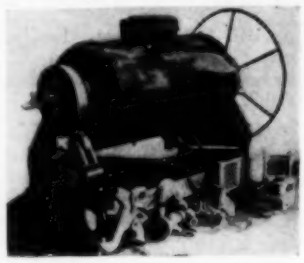


electric furnace with automatic temperature control, a gas-tight box of heat-resisting alloy which can withstand the action of the ammonia gas, an ammonia vessel with control valve, dissociation equipment with tubes, and a loading bogie for the box.

Furnace, Melting, Semi-Rotary

Armstrong-Whitworth & Co. (Engineers) Ltd., Newcastle-on-Tyne, England. (Vol.77, p.42E.) 39.

This non-crucible semi-rotary furnace has a tapping valve to handle work which previously necessitated the metal being handled by the shank method.



The metal can be poured direct into ingots or molds and the possibility of oxidation is reduced. The metal is drawn off from the bottom of the bath. The furnace is of 3½ cwt. brass capacity and heated by oil or by illuminating gas. While designed for melting gunmetal, brass and bronze, the furnace may be used for borings and scrap.

Pyrometer, Optical, Siemens

Elliott Brothers (London), Ltd., Lewisham, S.E., England. (Vol.77,p.491E.) 200.

The Siemens cross-filament pyrometer is direct-reading and completely self-contained. The principle involved is that of maintaining the filament of an electric lamp at a definite known and constant temperature, and reducing the incoming radiation from the hot body until the fila-

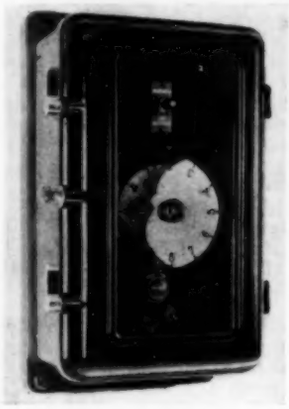
ment apparently disappears into the background. This is accomplished by the interposition of a wedge-shaped graduated absorption screen calibrated in temperature degrees between the standard lamp and the hot body. Two ranges are available, namely, 800 to 1,500 deg. C., and 900 to 1,800 deg. C.

Controller, Temperature-Cycle

Elliott Bros. (London), Ltd., Lewisham, S.E., England. (Vol. 77,p.603E.) 234.

This Siemens time-cycle temperature controller has the dial marked for a cycle of 12 hr. Behind the dial is a cam for the desired temperature cycle. The cam is revolved by clockwork or a.c. synchronous motor.

Gear wheels permit variations in the cycle. The cycle can be set to obtain the attainment of specified temperature in a specified time, the maintenance of the temperature for a certain time, and the gradual reduction of the temperature over a period.



Thermostat, Furnace

General Electric Co., Ltd., Kingsway, London, W.C., England. (Vol.77,p.287E.) 140.

This thermostat can be calibrated for any setting up to 600 deg. C. The electrical apparatus is suitable for dealing with 15 amp. ac. or 10 amp. d.c. up to 250 volts.

Transmission Equipment

Chain, V-Belt

Catmur Machine Tool Corp., Caxton St., Westminster, S.W., England. (Vol.77,p.299E.) 144.

This "Cork" chain V-belt consists of a standard steel roller driving chain which takes the load. Over this steel clips

are sprung, these having leather pads on each side and the pads being tapered to suit the angle of groove in the pulleys. These pads are made of compressed impervious leather.

Clutch, Automatic, "Pulvis"

British Rema Manufacturing Co., Ltd., Halifax, England. (Vol.76,p.557E.) 7.

The housing is serrated on the inside and the rotor carries an impeller keyed to the shaft. A quantity of shot is introduced in the housing. The central impeller pushes its way through the shot which can pass through the blades, thus starting with no load resistance until the load is picked up by the slipping drive, the slip decreasing until the shot is packed in front of the impeller blades. The length of starting period can be adjusted.

Couplings, Flexible, Axien

Turbine Gears, Ltd., Hyde, England. (Vol.77,p.62E.) 57.

Springs are arranged radially in groups, each group consisting of a number of thin laminations giving the maximum

flexibility. As the load increases the free length of the spring is reduced, support being obtained from the inner projecting lugs on the flange.

Coupling, Flexible

Standage Power Coupings, Ltd., 100 Blackstock Road, London, N., England (Vol.77, p.538E.) 213.

A standardized range of resilient couplings has been introduced for parallel drives from fractional horsepowers up to 3,000 hp. or more, and for angular driving up to 22 deg. Illustrated is a standard parallel drive coupling with portions of the covers cut away to show the interior. Drive is through a series of spring units set across the circumference of the coupling.

Pulley, Split

Williams & Womersley, Wakefield, England. (Vol.77, p.42E.) 38.

Pulleys are made with interchangeable bushings for various shaft diameters. The hinge is of the self-locking type. Both halves may be detached.

Reduction Gears, Worm

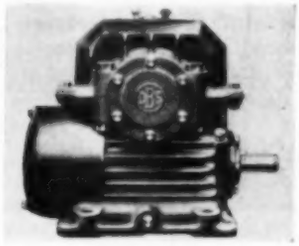
Matterson, Ltd., Shawclough, Rochdale, England. (Vol.77, p.75E.) 60.

This worm gear reduction is made in sizes from 10 to 21 in. centers. The wormwheel has a phosphor-bronze rim, gearing with a hardened and ground worm. Both worm and wheel shafts have ball bearings.

Reduction Gears, Worm

D. Brown & Sons (Huddersfield), Ltd., Huddersfield, England. (Vol.77,p.242E.) 122.

"Radicon" worm reduction sets are manufactured in units ranging from 4 up to 14 in. centers. Increased efficiency



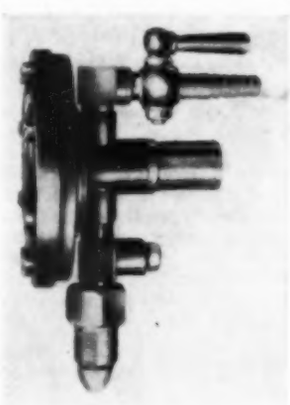
arises from the use of a smaller gear with reduction in friction losses. To compensate for the increased loading, oversize bearings are used.

Miscellaneous Equipment

Acetylene Regulator

British Oxygen Co., Ltd., Upper Edmonton, London, N. England. (Vol.77,p.490E.) 198.

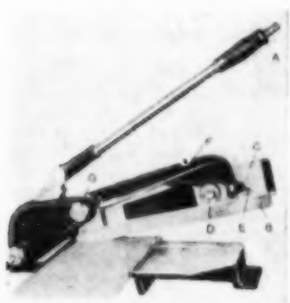
This acetylene regulator is of the vacuum or suction type so that gases cannot accumulate in the tubing when the cutting operation ceases. The appliance is suitable for metal cutting of all classes, except cast iron, but cannot be employed for welding.



Belt Cutter, "New Klincha"

W. T. Nicholson & Clipper Co., Ltd., King St., Salford, England. (Vol77,p.555E.) 220.

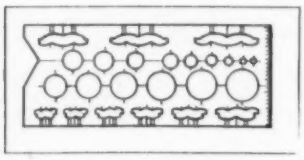
This tool will cut belts up to 16 in. wide by ½ in. thick. The tool is operated by the lever, but instead of cutting from back to front, the blade is lowered until it lies flat over the belt when a draw-cutting action takes place with a circular sweeping movement. This action is effected by a slotted cam attached to the end of the lever.



Drafting Templet, "Ezeeway"

Michell Cox & Co., Ltd., Windsor House, Victoria St., London, S. W., England. (Vol. 77,p.430E.) 178.

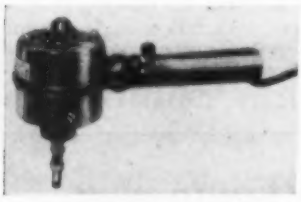
The templet is made of celluloid and measures 7½ x 3¼ in. It has three plain square edges so that it may be used as a set square. Numerous cut-out forms are provided for the purpose of drawing in front and side elevations of hexagon bolt heads, also the plan view, the diameter of the bolt and the bottom of the thread.



Erasing Tool, Electric

B. J. Hall & Co., Ltd., Dacre St., Westminster, S.W., England. (Vol.77,p.11E.) 30.

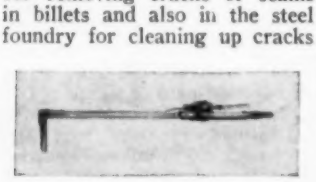
A small universal motor is mounted in the moulded bakelite case and the armature spindle bears a chuck that carries the eraser in the form of a short pencil.



Grooving Cutter, Oxygen

British Oxygen Co., Ltd., Upper Edmonton, London, N., England. (Vol.77,p.524E.) 210.

This grooving cutter is used for removing cracks or seams in billets and also in the steel foundry for cleaning up cracks



and sand holes. Rough surface planing can be done with a cutting head fitted with multiple nozzles.

Lettering Guides, "Standardgraph"

J. W. Smith, High St., Coventry, England. (Vol.76,p650E.)

Each guide is a strip of transparent material with a beading on the longitudinal edges to keep it clear of the drawing. In these strips apertures or guides are cut to the shape of the letters and numerals and a special pen is provided which is moved in contact with the sides of the required stencil opening.

Motors, Machine-Tool

British Thomson - Houston Co., Ltd., Rugby, England. (Vol.77,p.458E.) 183.

Built-in motors for machine tools consist of a wound stator and a rotor, the frame or end-shields and the shaft or bearings being provided by the machine-tool maker. Range of size of the stator and rotor units is illustrated. The outside diameter of the large stator is 16⅜ in.; that of the small stator, 3⅜ in.

Oil Purifying Apparatus

British Separators, Ltd., Buckingham Works, York, England. (Vol.76,p.542E.) 3.

Equipment consists of a 36-in. extractor with a perforated basket. The drive is by 12 hp. motor. About 93 per cent of the oil can be recovered. An oil purifier consists of two rotary gear pumps, one pump for treating the oil from the dirty oil tank and the second pump discharging the clean oil. Immersion heaters are used.

Pump, Coolant

Drysdale & Co., Ltd., Yoker, Glasgow, Scotland. (Vol. 76, p.644E.) 25.

This pump is designed for machine-tool lubrication and cooling. Called the "Wee-Mac," it runs at speeds suitable for direct coupling to electric motors. The impeller is a plain disk with a number of blades arranged around the periphery and rotating inside a concentric casing having a wedge-shaped passage on each side of the impeller. Suction lifts are up to 28 ft.

Pyrometer, Foundry

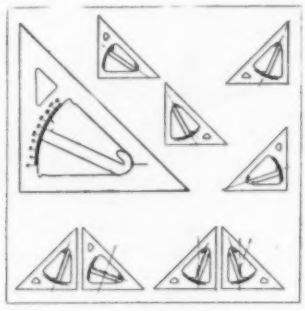
Foster Instrument Co., Letchworth, England, (Vol.77,p.60E.)

This pyrometer, suitable for measuring the temperatures of molten non-ferrous alloys up to 1,300 deg. C., has a small shock-proof indicator. The indicator is mounted on a handle from which protrudes a metal tube having at its end a small inclosed connector head into which two bare thermo-couple elements are held by screws.

Set Square, Universal Protractor-Type

Mitchell Cox & Co., Ltd., Windsor House, Victoria St., S.W., England. (Vol.77, p.269E.) 130.

This universal set square is a 45 deg. set square combined with a protractor for all angles up to 180 deg. The protractor

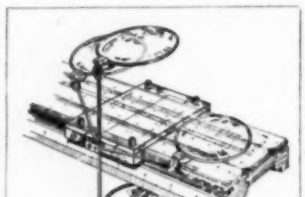


bar is contained within the set square itself. The drawing edge swings about a fixed center. Two sizes are available, one with 9 in. sides and the other with 12 in. sides.

Magnifier Attachment, Slide-Rule-Cursor

A. G. Thornton, Ltd., King St., West, Manchester, England. (Vol.77,p.539E.) 215.

An adjustable magnifying glass is now available to be attached to the cursor of the slide rule, and the magnification is not restricted to a comparatively



narrow area. Magnification is approximately 8 times. When not required, the device can be folded down flat with the rule.

Slide Rule, Engineer's and Commercial

A. G. Thornton, Ltd., King St., West, Manchester, England. (Vol.77,p.152E.) 97.

This "P.I.C." slide rule is an engineer's rule with the addition of a differential scale for the use of the rule on commercial calculations on such matters as depreciation factors, compounding, loan and sinking fund charges as required on the financial side of engineering calculations. The slide rule is available with a scale length of 5, 7½ and 10 in., and with a frameless or framed glass cursor.

Tachometer, Cross-Pendulum, "Orbit"

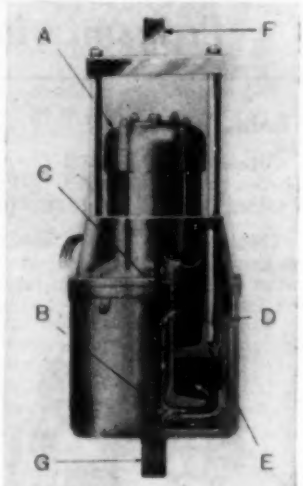
Budenberg Gauge Co., Ltd., Broadheath, near Manchester, England. (Vol.77,p.347E.) 159.

Tachometers of pulley or direct-driven pattern have a spring-loaded governor, duplicated and balanced. The damping effect of inertia rather than friction is used for the purpose of smoothing out small drive irregularities while retaining quick response for speed changes.

Thrustor, Electro-Hydraulic

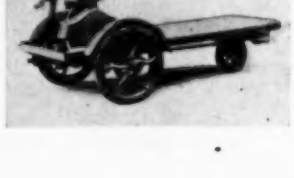
British Thomson-Houston Co., Ltd., Rugby, England. (Vol. 76, p.540E.) 1.

Uniform straightline thrust through a given stroke is obtained by oil pressure generated beneath a piston by means of a small impeller mounted on the extended shaft of a small high-speed motor. The pressure is



transmitted by means of rods to a top crossbar carrying a clevis. The device is mounted on a second clevis cast solid with the outer cylinder. Capacity: smallest size, maximum thrust 75 lb. with a maximum stroke of 8 in.; the largest size, thrust 502 lb., stroke 5 in.

Truck, Three-Wheel

Petters, Ltd., Yeovil, England. (Vol.77,p.315E.) 152.

The truck is for loads up to one ton, with a load platform measuring 6 ft 8 in. by 3 ft. 6 in., while the height from the ground is 1 ft. 8 in. The frame is of angle steel and the platform is of wood. The engine is of the Peter four-stroke type.